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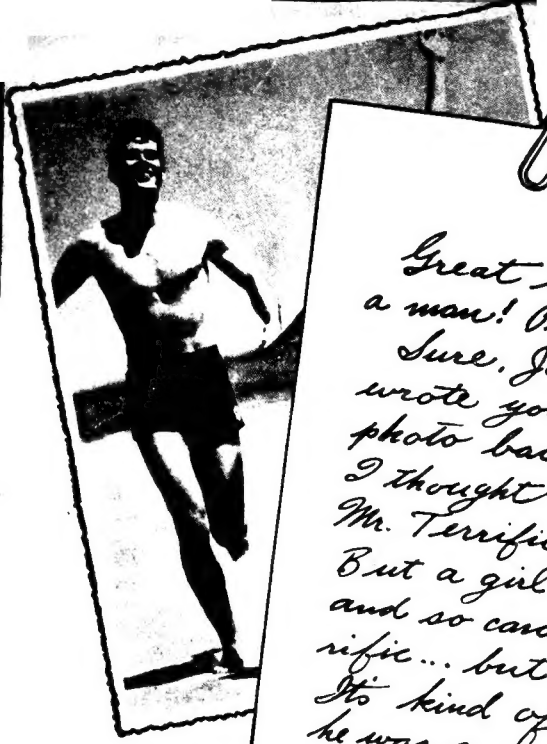
SLAVES OF THE LAMP

BY ARTHUR LEO ZAGAT



SEASIDE COTTAGE

Wednesday

Great big beautiful hunk of a man! Oh, yeah?

Sure, Janie, that's what I wrote you about him and the photo backs it up. No kidding, I thought he was going to be my Mr. Terrific for 2 whole weeks! But a girl can make a mistake and so can a photo. He was terrific... but terrific the wrong way. It's kind of a shame, too, because he was a nice boy otherwise. But who's going to put up with a case of halitosis (bad breath) on a moon light night? Not Fastidious Me... not Elegant You!

Come on up for the week end and I'll guarantee you a double date and a breathless evening with a couple of boys that make Listerine Antiseptic a "must."

Phone me,

Suzie

VACATION HINT:

Before any date where you want to be at your best don't take chances with your breath. Use Listerine Antiseptic. It's the easy, delightful precaution against non-systemic halitosis that millions rely on. Lambert Pharmacal Co., *St. Louis, Mo.*

A Timely Message to Americans

from
The Secretary of the Treasury

America has much to be thankful for.

Abroad we have overcome enemies whose strength not long ago sent a shudder of fear throughout the world.

At home we have checked an enemy that would have impaired our economy and our American way of life. That enemy was inflation—runaway prices.

The credit for this achievement, like the credit for military victory, belongs to the people.

You—the individual American citizen—have kept our economy strong in the face of the greatest inflationary threat this nation ever faced.

You did it by simple, everyday acts of good citizenship.

You put, on the average, nearly one-fourth of your income into War Bonds and other savings. The 85,000,000 owners of War Bonds not only helped pay the costs of war, but also contributed greatly to a stable, prosperous postwar nation.

You, the individual American citizen, also helped by cooperation with rationing, price and wage controls, by exercising restraint in your buying and by accepting high wartime taxes.

All those things relieved the pressure on prices.

THE TASK AHEAD

We now set our faces toward this future: a prosperous, stable postwar America—an America with jobs and an opportunity for all.

To achieve this we must steer a firm course between an inflationary price rise such as followed World War I and a deflation that might mean prolonged unemployment. Prices rose more sharply after the last war than they did during the conflict and paved the way for the depression that followed—a depression which meant unemployment, business failures and farm foreclosures for many.

Today *you* can help steer our course toward a prosperous America:

—by buying all the Victory Bonds you can afford *and by holding on to the War Bonds you now have*

—by cooperating with such price, rationing and other controls as may be necessary for a while longer

—by continuing to exercise patience and good sense with high faith in our future.

The challenge to America of switching from war to peace with a minimum of clashing gears is a big one.

But it is a small one compared to the tasks this nation has accomplished since Sunday, December 7, 1941.

Fred M. Vinson

Secretary of the Treasury

A Government message prepared by the War Advertising Council; and contributed by this magazine in cooperation with the Magazine Publishers of America.

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ASTOUNDING
SCIENCE FICTION

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NEXT ISSUE ON SALE AUGUST 20, 1946

Sensory Equipment

I've forgotten whether the physiologists say man has twenty-one or twenty-three senses, but it is, in any case, a lot more than the conventional five, of course. There's the sense of joint position—you have a special sensory organ in every joint that measures the angle formed by the two bones at that joint. Of course most people realize they have a special sensory mechanism in the skull, just back of the ear, that measures the position of the head relative to the direction "down", but most people neglect to consider just how they succeed in standing vertical when the head is tilted and the eyes are closed. The organ of balance is off center; if it weren't for the sense or joint position reporting the position of the bones of the neck, every time you shut your eyes and tilted your head you'd fall over.

Then there's a neat, specialized sensory organ that performs the delicate operation of measuring the relative concentration of ions in the bloodstream. When the ion concentration gets a little high, the sensory organ signals the brain, "Better add a little more plain water to the system; the blood stream's getting thirsty." We've spoken of a sense of thirst for years; why not include that in the count of senses? It's real enough.

Of course the sensation of rate of heat flow through the skin is normally lumped under "sense of touch", though it's actually due to another group of specialized nerve endings. But that's a *relative* sense; it measures the rate and direction of heat flow. If heat flows out from the skin rapidly, it says "cold"! If it finds a rapid influx of heat, the report is "hot". (So a piece of copper feels a lot hotter at 150°F. than does a piece of wood at the same temperature — the rate of flow is greater.)

Actually we have, of course, a Grade A sensory organ for measuring not relative, but absolute temperature. It doesn't report to the conscious mind directly, but to the Department of Body Controls. But it does a swell job of maintaining the body temperature at 98.6°F.—unless the Department of Controls finds that a temperature of 102° or so would make the fight against an infection easier. But it's a special sensory organ, certainly.

Another very necessary sense—and a multi-functional one—is the specialized set of nerve fibers that produce the sense of muscle tension. Put your hand back down on a table, and press it firmly against the surface, then try a variety of objects on the palm of the hand and try to

judge their weight. You'll find very quickly that the sense of touch has mighty little to do with weighing an object in the hand; it's actually accomplished by the muscle-tension measurements of that specialized set of nerves. That sense is needed for a variety of functions. It helps weigh objects, it tells you when to quit pulling, unless you want to rupture your muscle, or break a bone. It tells you when the car you're in is accelerating, and at what rate, by the changes in muscle tensions needed to hold yourself in position.

There are, of course, a lot more regulatory senses which, like the body's thermostat, report directly to the Department of Body Controls rather than to the conscious, or Department of What Do We Do Next, section of the mind. The secretion of many of the glands is controlled in this way. But there are far more true conscious-sense systems than we ordinarily realize.

There remains one great lack. All of man's senses have been developed, during the past 2,000,000,000 years, to assure the survival of a land animal. Man has now developed some new ideas that just don't jibe; he insists on becoming an aerial creature, capable of fast flight, and he's just not equipped for it. The pigeon has a specialized sense of direction—it seems to be affected, if not paralyzed completely, by radio transmitters. The bat has developed a specialized sensory mechanism for avoiding unseen obstacles.

The habits of bats I don't know precisely, but pigeons and other birds refuse to take off at night or when the visibility is reduced to zero. They've spent 2,000,000,000 years learning to fly, and can't yet fly in a fog.

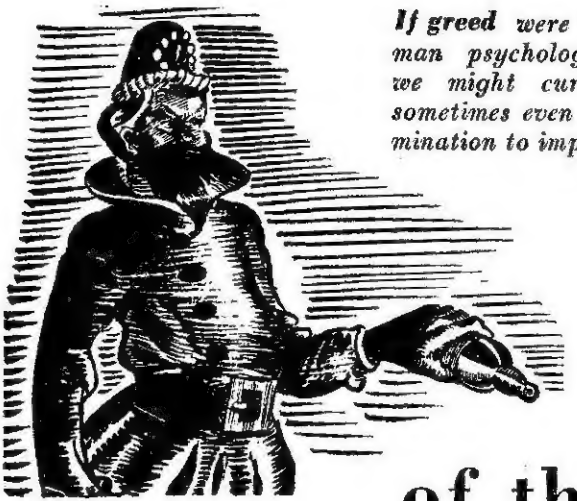
Man has developed sensory equipment that would make such flight safe and practicable—the robot sensory equipment of radar. Without it, man bumps into things in the fog just as birds do—but unlike birds, man still tries to fly in the fog.

And radar, unfortunately, isn't available to flyers. The Army and Navy has a lot of surplus radar gear which is, under the requirements of strictly enforced rulings, being sold as junk. The rulings see to it that when it is sold as junk it *is* junk; it is first given a once-over-thoroughly by a steam roller.

So far, none of the big commercial airports has installed a radar ground-controlled approach system. None of them, as a matter of fact, has installed a radar system at all.

But fortunately, so far New York City's tall buildings have proven much sturdier than any of the planes that have hit them, so I suppose it's all right. They're still killing only a few people at a time. Of course one of the newer eighty-passenger giant transports striking a downtown building during the lunch hour might change the score somewhat, but a really good radar installation, after all, would cost an airport almost as much as a big plane, and wouldn't earn anything. Apparently it isn't worth while so long as we're killing only five to twenty people at a time.

THE EDITOR.



If greed were the only feature of human psychology men had to fear, we might cure the problem. But sometimes even worse is a man's determination to improve his fellow man. . . .

Slaves of the Lamp

by ARTHUR LEO ZAGAT

I.

Man shifts the great rivers and pens them, he bores the bowels of the Earth. He levels the mountains and raises dry lands where the green tides once rolled. At his will Man traces highways through the impalpable air, traverses the oceans' deep gloom. With the harnessed might of the atom he banishes the night and he makes the desert to bloom. Pigmy-bodied, giant-minded, Man shapes his world to his needs.

One thing alone defies Man's skill and his will. One sole thing Man cannot change, the fundamental nature of Man.

Riis Narghil (2088-2163)

The sentences glowed in cold light on a wall so vast that though each character was a half meter wide and proportionately high, they seemed very lonely on the dim expanse. Above the inscription, not so much entitling it as utterly altering its author's meaning, was the single word:

CHALLENGE

Natlane had never quite been able to bring himself to ask any of the other Lampmen whether they shared a certain strange experience with him.

Sometimes at once, sometimes only some minutes after his vigil had begun, he would become part of his Lamp's flame. There was never any definite transition. The globe would not expand to embrace him, nor would he seem to dwindle and sink through its shell.

One moment he would be crouched in the cubicle on the Peace Dome's Gallery. His visored gaze would be intent on the ball of transparent vi-

tron, half again the diameter of a man's head, the sparks within it innumerable. They seemed a solid mass, their colors — violet, yellow, green, crimson — so exactly balanced, the lumisphere seemed from a little distance pure white. He would be perfectly aware of the Lamp as a separate entity, of the dim row of push buttons studding the metal base in which it was cupped, of the Gallery's shadowed sweep interminably away from him to either side.

One moment he would be Natlane, Chicago Lamp, Shift Three. The next he'd be a spark within the coruscant sphere, a mere crepitant point of brilliance among myriads.

The phenomenon did not at all interfere with his efficiency. Let the slightest chromatic imbalance occur and instantly Natlane was outside it again. Clear-brained, alert, he would be prepared instantly to evaluate the indicated aberration in the even temperament of the distant City and decide whether it warned of some threat to the Peace of the World, prepared if it did to signal the Experts and the Technicians on the Dome's Floor.

If, however, there had been no shift to the red of irritation or the blue of depression and when his trick ended he were still in this strange state — of autohypnosis he supposed it was—his relief's hand on Natlane's shoulder would wrench him back to normalcy with a violence that had him physically ill, for agonizing seconds.

As now.

"O.K., Mart," he mumbled, fighting waves of nausea more distressing than any before. "I . . . I'll get out of your way in two ticks." He swallowed hard, tried to dissemble his condition with, "You startled me. I didn't realize it was anywhere near four yet."

"It ain't." Struggling out of his seat, Natlane discerned that it wasn't Martadams, Shift Four, who slid into it but one of the extras who filled in when some personal emergency necessitated a Lampman's temporary absence from his cubicle. "It's eleven-thirteen."

"Eleven-thir— Vicdell! There's some mistake. I didn't buzz for a relief."

"No mistake," the other grunted, his hooded eyes already fixed on the Lamp. "You're wanted up top, by the chief of staff, no less."

A muscle knotted at the point of Natlane's gaunt jaw. "What does Van Gooch want of me?"

A shrug of bent shoulders. "He forgot to tell me, believe it or not. Look, brother," Vicdell went on, "it's none of my never mind but if I were you, I'd get up there fast as that gyrcar will take me."

"Yeh, yeh, I guess you're right."

As he moved across the Gallery to the slim aerbat hovering, gunwale against the broad rail, Natlane's thoughtful brow was furrowed and his lean frame tight strung with taut nerves. A summons from Rudolf van Gooch was too rare an event to be considered lightly but there was no good reason for apprehension.

Nevertheless, apprehension brooded darkly in the Lampman's dark eyes.

The Gallery from which the gyrcar whispered away was a long stretch of dimness relieved only by the opalescent glow of the Hoskins Lamps, before each a motionless shadow-shape, face eerily disembodied in the soft radiance. The Gallery was hushed, somnolent, but far below, the Dome's floor was electric with an antlike bustle.

From the soaring, unillumined roof, so high and so completely without visible prop it seemed a veritable sky, two white shafts of light struck vertically down through the gloom and made brilliant the giant semiglobes at the foci of the thousand hectare ellipse. Midget-seeming at worktables aligned radiant from and concentric to these shining hubs, the experts drew their graphs or collated tables of data on the temperament characteristics of their respective Cities. Rimming the vast oval and retreating beneath the cantilevered balcony, the technicians swarmed among their gauges and switchboards, their gleaming busbars and coiled serpent-jungles of cables more dangerous than serpents with the tremendous potentials of the Neural Currents that could lull a City to torpidity or fire it with human passions.

The force-field of Natlane's gyrcar thrummed as it fended off a one-seater. Flaunting the purple stripe of a Staffman of the Sociological Control Board, the other craft darted away, was lost in the innumerable gnat-dance of its kind. The Lampman's tiny car sighed to a halt.

The inverted turret that was the Peace Dome's nerve center hung from the roof, midway between the two light shafts. There was no visible break in its gleaming aludur wall, but almost at once an aperture soundlessly opened to admit Natlane.

As noiselessly, it shut again behind him and the hush was so profound his ears seemed abruptly stuffed with cotton wool. He stood rigid, pupils dilated for dimness dazzled by the brightness of artificial daylight.

He felt eyes on him. A hard knot tightened at the pit of his stomach. "Lampman Natlane," a toneless voice droned, "Chicago Lamp. Shift Three." His vision cleared and he saw a tawny-tressed girl behind a desk that barely left room for him in a narrow anteroom.

"You know me?"

Natty in a feminized version of his own blue-green uniform, she looked right through him. "Have him wait," the desk's blank surface murmured and it dawned on Nat that the girl had not greeted but announced him.

"I shall have Lampman Natlane wait," she acknowledged. Her fingers, long and slim and ruby-tipped, moved on the desk's edge. Her cool, gray eyes became aware of him. "I didn't know you," she smiled, her voice friendly now, "till the portal opened for you."

"You mean it wouldn't have opened for anyone else?"

"Right. It was set for your electroneural aura." From a slit in a boxlike contrivance set on legs beside her, she produced an eight by thirteen cm rectangle of plastic per-

forated in an apparently random pattern. "Your personnel card, Lampman." Mischief tugged at the corners of her generous mouth. "I can read it offhand, so don't ever get the notion you can kid me about you."

"I won't," Natlane promised, a bit grimly. "If you can read those punches, you know me far better than I do myself. Suppose you tell me about me while I'm waiting."

"Hm-m-m." The girl's eyes dropped to the slit into which she was inserting the card. "It wouldn't be good for you. But I can give you a little advice. Keep your temper in check when you get in there. Watch every syllable you say."

A vague sense of urgency in her tone prickled Nat's spine, but he realized it would be useless to demand an explanation. "Thanks," he smiled and then as she looked up at him, "You know my name. How about telling me yours?"

Golden flecks danced in the silvery gray of her irises. "Marilee," she told him. "And I'm a Chian too."

"I can still smell the lake winds in your hair, Marilee," Nat mused. "You would be Mary Lee back home. I—" A buzz cut him off and Marilee's fingers flew to the desk edge. "Sir?"

"Send in Lampman Natlane."

"Send in Lampman Natlane." She was once more coldly impersonal, all warmth gone from her voice. "To your right, please."

"What—?" To Natlane's right, a meter from his nose, was only blank metal, then a black spot appeared on the aludur surface, was swiftly expanding, irislike.

It was a hole piercing the barrier. It was an oval opening, just large enough to let him through. He stepped into a space little more than a meter square, the ceiling so low it seemed to press on his scalp. Another blank wall confronted him—

Darkness enveloped Natlane, so black it thumbed his eyeballs!

He whirled back, pawed at cold metal—the wall through which he'd entered, solid again. A dart of bluish light leaped eerily about and panic struck at him.

He wanted out. He wanted to get out of here. He wanted to get free of this trap.

II.

No use hammering at this wall with his fists, trinitrate wouldn't blast it open. Natlane got a grip on himself, was still, hands hard against the aludur that shut him in.

The bluish spark was motionless at the level of his chest, a little to the left.

The Lampman's lips twitched into a grimace half self-mockery at reasonless terror, half resentment of the invasion of his privacy the spatter of luminance betrayed. Thorium tetrachlor was fluorescent in ultraspectral light; and some had dried on his wrist from a splash in the laboratory. The gamm-eta vibration, of course. Someone had a search ray on him!

They didn't have to scare him breathless to do that, even if the beam was more efficient in complete

darkness. Queer that it should be turned on him at all.

The whole setup was queer, for that matter. In a co-operative society, why should this aerie be inaccessible except by aerbat? Why should its outer portal be ingeniously guarded against unaccredited intrusion, the inner entrance to the chief of staff's sanctum barred by iris shutters impregnable to anything short of an atomic blast?

Of what was Rudolf van Gooch, guardian of the world's peace, afraid?

The blue spark vanished! The search ray was off.

Behind Natlane was an almost inaudible whisper of sound. As he turned to it, light came back into the guard lock through an aperture in the inner wall that expanded in the same manner, and as swiftly, as that by which he'd come through the outer.

The room into which he stepped was surfaced, floor and walls and ceiling, with a single iridescent shimmer. Its planes melted into one another by sweeping curves so that it was impossible to tell where one ended and the other began. Soft radiance, sourced everywhere and nowhere, cast no shadows at all.

The chamber had a breathtaking quality of — *limitlessness* was the best word Nat could think of, knowing it to be inept

The only furnishing was a high-backed armchair of silvery cryston. In this, far across the footfall-muffling floor, sat a completely insignificant little man, motionless, emaciated hands idly lax in a shawled lap, lashless lids drooped as if in sleep.

Rudolf van Gooch was very old. Pacing towards him, Natlane recalled that he'd been in his prime, seventy-five or thereabouts, when he'd succeeded Rad Hoskins as chief. That was almost forty years ago. Van Gooch, therefore, must be well on to the century and a quarter and still active. A remarkable achievement, even discounting the progress the endocrinologists and metabolists had made in lengthening useful life span.

Or was it? How much truth was there in the whispers that the Superannuation Committee was more lenient in their annual examinations of the Peace Dome's chief of staff than with lesser centenarians?

Nearing the shrunken small figure in the great thronelike seat, gray-yellow, hairless, skin drawn tight over a fine-boned skull, his measure of years obviously all but emptied, Natlane was poignantly aware of his own smooth flowing muscles, of the vibrant throb in his elastic arteries, of his youthful strength.

The blue-scrabbled lids opened within their sunken sockets.

An almost physical impact stopped Nat in his tracks.

It was he who was insignficant before the wisdom, the mental force, the *drive* implicit in the tiny eyes that seized his and drained his brain dry.

They neither blinked nor shifted, but they finished with Natlane and somehow had released him. He contrived to make his stiff lips form

words. "I was directed to report to you, sir."

"Yes. I wished to talk with you. But sit down, my boy."

Sit down? Where? There was no— A chair *was* here, just behind Natlane and a little to his left. It must have come up through the floor, he decided as he sank into it, so smoothly and silently he had not noticed. "Somewhat theatrical, I agree," the old man responded to his unvoiced comment. "Nevertheless it has its purpose." A faint smile drifted across the almost human mask that was Van Gooch's face. "Some of my visitors need to be impressed so that even if I am alone with them, I am not altogether at their mercy."

Natlane's eyebrows lifted as he glanced at the guard lock and back to his chief. "No," the latter murmured. "No one can come in here with a weapon. But a pair of strong hands could break me in half, and there are those who find me in the way of their ambitions."

"Ambitions, sir?"

Again that half-shadow of a smile. "Housed within this Dome is the machinery that keeps the City States at peace through control of their people's emotions, very nearly of their will. What better instrument for world domination has ever existed? What more tempting prize for a ruthless man to seize?"

"But why should anyone want to seize it, sir?"

Van Gooch spread his skeleton hands. "Why should at least one among every group of laborers strive to become foreman of his gang? Why should certain citizens in every City connive and scheme and stultify themselves to be chosen Wardmen or Councilors? Why, in the old days did men flog themselves to accumulate wealth infinitely more than they could spend on the most luxurious living? Why in every era has some hitler made himself cursed by all men so that he might become master of all? What drives them to the sacrifices they make to gain —what?"

The ancient looked about the beautiful—and empty—room. "In the high places of the world there is loneliness and fear and gray regret. And one other thing—power."

"Power?" Natlane parroted.

"Power. Power over the lives and destinies of others. It is for this that the ambitious ones strive. It does not matter how it is used—for good or ill—so long as they may have it. So long as they have by that much made themselves"—the low and oddly sweet voice became almost inaudible—"demigods."

Van Gooch's lids drooped wearily and he withdrew into himself, left Natlane outside his awareness.

The Lampman listened to the rales of an old man's breathing, the crepitation of fabric against an old man's sere skin. The drooped lids lifted. "I understand, Lampman Natlane, that for the past six years you have devoted all your leisure hours to a certain research."

So he kept that close a check on his underlings, did he? "I have, sir."

"An attempt to divorce human be-

havior, is it not, from environmental influences?"

"To make the Rule of Reason in man's living possible of realization." A thrill of excitement came into Natlane's voice. "That's it, sir." Was the chief about to offer to make his voluntary study an official S.C.B. project with all that implied? "I think— No, sir, I'm *sure* I've found the right experiment-line at last. It's only a case of development now."

"Hm-m-m." Van Gooch watched his bony fingers erect a tent. "I sent for you, my boy, to suggest that it might be wise if you were to divert your surplus energies into some other channel."

Muscles knotted in the Lampman's throat. "To— You mean you want me to *drop* it?"

"Precisely."

Natlane swallowed. "But why, sir? Why should you? It doesn't interfere with my job. I—"

"There have been no complaints."

"Then I don't understand why you should be concerned."

Van Gooch sighed. "I am deeply concerned with the welfare of every member of the organization I have the privilege of administering."

That, Natlane thought, is pure bunk. Aloud, he said. "We all know and appreciate that, sir, but I assure you I am fully capable of looking after my own welfare."

"And that of the others?"

"What has my research to do with the others?"

"More than you appear to realize." The chief separated his fingertips, fitted them together again one by one, as meticulously as though he were adjusting some mechanical device to precise tolerances. "Have you considered that we have been especially trained to specialized tasks in a very specialized organization? Were that organization to lose its reason for being and be dissipated, a few of us are still young enough to adapt to other lines of endeavor; but most of us would return to our Cities as pensioners, superannuated long before the end of our useful life."

"If I succeed in bringing about the rule of reason, wars will be unthinkable and so this elaborate setup to prevent them no longer necessary. Are you asking me to abandon the search for a more efficient way to accomplish the purpose for which the Peace Dome was established in order to preserve the Dome itself, for its own sake?"

"Certainly not!" the ancient murmured. "Although it would not be the first time in history something similar has been done."

"I am aware of that, sir. Harl Stanlund's 'Secret History of Global Economics' was prescribed reading at school. May I remind you that Stanlund points out that such tactics never succeed in averting social changes, but merely delay them?"

"Until the social structure has been prepared to withstand the change," Van Gooch agreed. "In the meantime the pioneers have known the agonies of frustration. I want to spare you that, my son."

"Thanks." Nat could not help noticing the ironic intonation. "I'll take my chances. Maybe I'll never

see the results of my work; nevertheless I intend to keep at it."

"And if I forbid you?"

Dull anger pounded at Natlane's skull, but recollection of Marilee's warning stopped his first hot words. "If you should attempt it," he contrived an icy calm, "I should exercise my right under the union contract to demand a public hearing. I doubt, sir, that you would care to justify such an order, in the hearing of the world, unless you have better reasons than you've just given me."

The aged mask did not change, but Natlane sensed grudging approval in Van Gooch's meditative, "Hm-m-m. And you are quite sure I haven't." The tented fingers rippled against one another and dropped wearily to the shawled lap. "Very well," he sighed, and then, "Your shift is almost over. You need not return to your Lamp."

Natlane's legs seemed to be moving through some invisible, clotting miasma as he went toward the aperture widening in the far wall. He'd won in the sudden conflict of wills —or had he? Was not the triumph too facile?

He reached the guard lock, went into it—*"Lampman Natlane!"*

Rudolf van Gooch's eyes were on him, across shimmering space. Even at that distance they tightened the cords in his neck. "To be a demigod, Natlane," Van Gooch's low, sweet voice came to him, "is much to look forward to, a poor thing to have—and death to let go of, once you have it."

The iris shutter blanked out the room. The momentary blackness was frightening. Or was it the blackness?

III.

"Natlane!" a startled voice broke in on the Lampman's absorption. "Hi, Nat! What the blue blazes are you doing here?" Dropping down through the Dome's vast murk, his gyrcar, preset, had soughed to rest at an entrance thronged with Shift Four psychomers reporting for the noon changeover. "Why ain't you on your Lamp?"

The chap who came up was chunky of frame and shoulder, broadly molded of blunt-jawed countenance, carrot-thatched. "Morning, Stanrod." Natlane grunted and started to disembark but was blocked off by the other. The lines in Nat's dark face cut deeper. "Do you mind letting me out?"

"I sure do." Stanrod didn't move, but his freckle-dusted grin was warming. "You haven't answered me."

"I was relieved early," Nat said curtly.

"So I see. But why?"

There was no good reason why he shouldn't tell him, no reason at all except a transference of resentment. "There's a warning whistle, Stan." A thin pipe, it was, not so much sound as a needle piercing one's eardrums. "You'd better get started for your cubby."

"Yeh. I better had." In a single lithe flow of movement Stanrod was seated beside Natlane. "Let's go."

"I—"

"Oh, don't thank me," Stan

grinned. "It's a pleasure to have you ride with me." The aerbat lifted, curved gracefully and flitted in its long rising slant to the Lamp Gallery. "O.K., boy. Spill it."

"There's nothing to spill." It was hard to resist that infectious, boyish smile. "I got a half-hour off, that's all." Natlane's eyes, avoiding it, found the enormous letters of light on the looming wall. "'One sole thing Man cannot change,'" he read aloud, changing the subject, "'the fundamental nature of Man.' Has it ever occurred to you that we're no nearer answering that defi than when it was first put there more than six decades ago?"

Stanrod shrugged in good-natured surrender, said, "Oh, I don't know. Seem's to me the SCB's doing a pretty good job. There've been few quarrels among the City-States since the Dome swung into function, and no actual war anywhere."

"So what? We've held the world to peace for a generation or two, but the germs of war are still in the blood of the race. Let us relax our vigilance and—Hell! Only yesterday my Lamp slid three chromens to the red and we had to shoot low potential till half Chi was logy."

"Yeh, I got the same flurry though Nyork went only one point eight bad before the Current took hold. But what's the use crabbing, Nat? When the ionic ceiling thins

enough to sift through an extra dose of cosmic rays, the irritability index of homo more or less sapiens is bound to up a few figures.

"Which is precisely what hets me. Why, at this stage in the evolution of Science, should my behavior still be conditioned by the number of cosmons per second impinging on my skin, or the barometric pressure of my atmosphere or its geostatic tension—?"

"Or the amount of sleep you've had between tricks" Stan chuckled. "Your own Irritation Index's at an all-time high, young fellah m'lad. Fess up. How many hours did you spend in the Lab Wing since your last off-shift?"

"None of your blasted— Oh, all right. All there were, if you must know." One couldn't hold sullenness in the face of that friendly, frank grin. "I can't spare time for sleep. There's so much to do and so little time in which to do it."

"Who's deadlining you all of a sudden?"

"No one." Natlane thrust ascetic fingers through his wiry tangle of black hair. "My nemesis is the same lug who's waiting to terminate all our projects—and us. Old Man Blackout."

"Slap me with a million volt arc," Stanrod hooted, "and call me a neutron! When are they bringing you up for superannuation?" He sobered, hand impulsively on the other's shoulder. "You're barely twenty-eight. You've got at least seventy years of useful life ahead of you. You're just tired."

Not tired, Natlane thought. Puzzled. There was something else behind that strange interview with Van Gooch than the explanation the chief had vouchsafed. Some impelling, *personal* motive—but it was difficult for him to accept that. Van Gooch had gotten to be chief because of the consistent altruism of his efforts. His administration had always been in line with the traditional democracy of the SCB. His position paid him little more than an expert, and living conditions were pretty much the same for everyone at the Dome. He had warned Natlane against power for power's sake; therefore it did not seem likely that he, Van Gooch, would be a victim of megalomania. On the other hand, the sufferer always knows the symptoms. He shook his head in puzzlement . . . "You're going on with that research of yours, Nat?" Stanrod was asking. "You're bound and determined to plug it to the bitter end?"

Nat jerked to him, startled. "What . . . what gives you the notion I'm not?"

"I don't know." His carrot-topped seatmate grinned crookedly. "Guess it's just wishful thinking."

"Wishful! You want me to quit!"

Sudden tension was sharp between the friends. "Frankly, Nat, yes." Stanrod looked unhappy, but blundered on. "I—what you're after—well, it sort of scares me."

"Scares you?"

"Don't ask me why. I haven't the least idea."

"I do." Tiny light-worms crawled in somber eyes. "The same psy-

chology that has moved men to oppose every scientific advance since the dawn of thought." He had it now, what had motivated Van Gooch. "You resent, instinctively but profoundly, any attempt to amend the rational philosophy in which you've been nurtured."

"Pishtush and piffle."

"The truth, Stan. Look at it realistically. I propose to emancipate Man from physical determination of his behavior, to enable him to conduct himself in accord with the dictates of his reason and his reason alone. I want to make him in actuality what he falsely claims to be, a thinking being. What's wrong with that?"

"For one thing, it presumes free will—"

"Which you have been taught is impossible."

"Taught!" Stanrod snorted. "It's too obvious to need teaching. The manner in which an individual reacts to any situation is preordained by the ancestral complex of his genes as modified by his foetal history—"

"Plus every environmental contact from conception to the instant of decision. Yeh," Natlane observed sardonically. "I also learned to parrot that statement—"

"Which is based on generations of trained observation and experiment, but you have the consummate gall to question its validity."

"Not at all. What I deny is its inevitability, and that is precisely what disturbs you. You desire, with every atom of your psyche, the assurance that you live in a static universe."

"Huh?" Stanrod looked puzzled.

"Look, guy." Natlane explained himself. "Much as we have learned of our cosmos, we still dwell, like Caliban musing upon Setebos, on a tiny island of the Known encompassed by the immeasurable, dark Unknown. Like Caliban, we cling desperately to the security of our familiar rock, the solidity of established facts, of eternal truths. Let's admit that truths are not always eternal, that fact may become nonfact and, once more like Caliban seeing his island suddenly change contour to some new, strange shape, we are appalled."

He pulled in breath. "Scared. Of course it scares you."

"So that's what's wrong with me?" Stan rubbed the edge of his blunt jaw with a contemplative thumb. "Could be." His irrepressible grin struggled to break through his unaccustomed gravity. "Only it isn't— Well, here's my Station."

The gyrcar had slewed to the broad parapet. Stan leaped out, stood spraddle-legged, watching Natlane flit away.

"Somehow, my fran," he murmured, "I've a hunch you're heading for trouble — and plenty." Shrugging, he moved across the Gallery's dim width to the Nyork cubicle. The shadow-shrouded form within said, "Hi Stan," but did not alter its crouch over the seething brilliance of the Hoskins Lamp.

Stanrod peered at the lumisphere.

His lids narrowed. "Looks a bit bluish to me, Jo," he observed. "About a hundredth chromen, I'd say."

Jocarter glanced down at the gauge set into the metal shelf that sloped toward him from the Lamp's base. "Point zero eight nine," he grunted. "You've got a good eye, egg." His hooded gaze returned to the globe. "Been around there most of my trick but there's no nucleus of infection. My guess is the shift's due to a general overcast."

"Your *guess!* You haven't checked?"

"What for? It's not required till the off-white's more than five-hundredths, is it? Or has there been a new General Order I missed up on?"

"No. You haven't missed anything," Stan grinned, "but I always like to know what's causing even as slight a depression as this one. Be a good guy and tick Met, will you?"

"O.K., if it'll make you any happier." Only Jocarter's hand moved, going to the row of pushbuttons, thumbing one. Stanrod took his visor from its hook on the sidewall, from a pigeonhole the foamite pad he sybaritically had had fashioned to the exact conformation of his buttocks, turned back to listen to a brassy, apparently sourceless drone.

"Nyork report," it intoned. "At six fifty-eight and a quarter Eastern Standard Time. Temp: Twenty point four C. Pressure: Seventy-five point five one, rising. Relative humidity: Forty-six point four percent. Cosmons: Normal. Wind: Light variable, generally westerly. Precipitation: None. Clouds: None. Visibility: infinite," and without change of intonation, "What's the idea, mugg, futsing me for a report two minutes before changeover?"

"Go duck your noodle," Jocarter said softly and released the button before the Metman could retort. But he couldn't thus easily shut off Stanrod's chaffing murmur, "A balmy spring dawn on the Hudson, eh. What price your overcast?"

The other watched his Lamp, expressionless; but there was faint uncertainty in his query. "Think I ought to flash the floor?"

"And have your expert crisp your ear for pesting him with a hundredth aberration just as he's going off-tick? Nix. If it holds through my watch, I'll hop over and take a look-see afterward. How's for coming along, if and when?"

"Sure, Stan. We'll use my flivver. I haven't had her off the ground in a month of Sundays. Give me a call— There's the second whistle."

Stanrod clipped on his eyeshade, deftly flicked the foamtite pad onto the seat Jocarter was vacating, slid into it almost before the latter was out of it. "I'll do that," he grunted, and at once was absorbed in his vigil over the lumisphere within which Rad Hoskins' miracle of neurophysics trapped the soul of a City-State five thousand kilometers distant.

IV.

Natlane crossed the bustling lobby of Recreation House, went through an archway into the laboratory wing. Someone called a greeting to him.

He answered abstractedly, too sunk in a brown study to take in who it was.

The door for which he made was labeled:

SOLID PLASTICS—SPECIAL.

A stride or two within, a massive counter ran the room's full width. From its longitudinal midline rose a wall of transparent but nonshatterable vitron, reinforced by an embedded latticework of feraldur strips. Behind this wall men moved around in the scaled metal suits the terrific pressures of modern chemistry impose on those who work with them, their hands metal-gloved, their heads inclosed in spherical helmets with huge, nightmarish goggles for eyes.

These grotesque apparitions were busily engaged with a battery of autoclaves, clamped vats whose ponderous walls vibrated and strained to the seething reactions they contained. As Natlane approached the counter, one at his left abruptly was enveloped in a cloud of brownish vapor and the machine apppended to it clacked into sudden animation.

The Lampman glanced toward it. A conveyor belt issuing from the machine's near end was in motion. It was carrying to the inner top of the counter a parade of maroon gadgets the size of a clenched fist, oddly shaped. A goggled attendant went unhurriedly to the growing pile, looked at a tag clipped beside it. A disk set into the partition rasped: "O.K., Hailassie. Come and get your junk."

"Junk!" laughed a kink-haired Addisababan, teeth startlingly white in the lustrous black of his face. "Listen, brother, if this 'junk' does what I hope it will do, my Lamp's going to come mighty near announcing what it wants in the Universal Language!"

"So you think you can improve on Rad Hoskins' job?"

"There's certainly no harm in trying, is there?"

Natlane picked up a stylus chained to the counter, studied a nullite plaque laid into its surface. Down the left side of the grayish oblong was embossed a list of specification terms, Specific Gravity, Density, Tensility, Malleability, Flexibility, Acid Resistance, Base Resistance, Magnetic Permeability; tens of others covering every imaginable property one might desire in a solid synthetic. Vertical columns to the right of this roster was headed by numerals, from one to a hundred, that by reference to a chart on the wall indicated the precise degree of each property, in its appropriate unit. Beneath all this, on the plaque, was space for working drawings of the shape desired in the finished product, the scale indicated.

"Natlane, my friend." A hand was laid on his arm. "How do you find yourself?" the liquid voice inquired.

"Alive and kicking, Ganehru," he told the sloe-eyed, rotund little Delhian. "Mostly kicking. And you?"

"Once more overwhelmed with awe each time I enter these precincts." Ganehru gestured to the scene beyond the partition. "I am educated scientifically; yet to me it still partakes immensely of black

magic that a substance of any specified qualification can be produced in a matter of moments directly from appropriate elements stored here in pure form." He was very earnest. "Each time I witness a conception of my brain materialize without human intervention, a feeling is aroused within me that I have performed an act of creation, that I am, euphemistically speaking, a demigod."

"A demigod," Natlane repeated; and Van Gooch's parting threat was once more at the forefront of his brain. Or was it a threat? A warning?

No use worrying about it. What happened would have to happen. In the meantime he must get on with his project. He'd better have this stuff delivered in sheet form, shape it manually. His stylus touched the appropriate box. He'd want it transparent, of course. A high melting point, about a thousand degrees, that was number eleven. Nonporous— "Sorry, Natlane," the disk headhigh to him said. "You're not registering. We can't fill your specs."

"Can't fill—" He gaped at the goggles that had appeared otherside the vitron. "You're off, mister. I haven't drawn anywhere near enough to exhaust my credits."

"It's not a question of credit, bud. It's just that we've got instructions to issue nothing to you." Natlane's fingers tightened on the stylus. "From Mr. Big himself. The chief."

So Van Gooch had—

"The reason?"

"No reason given. Just the order."

The swelling of his throat held Natlane speechless, but Ganehru was talking for him. "That is unconscionable. Under and as provided for by Article Twenty-four of standard contract, Sociological Control Board and/or any official holding office thereunder may not deny to any member of the Psychoneers' Union facilities accorded to all unless a sufficiency of reason for said denial be presented to and agreed upon by Executive Committee of Union, duly elected and authorized."

"Sure," the disk's voice said. "Sure it does. Why don't you guys bring it up at the Union meeting tonight?"

"That," Natlane said flatly, "is exactly what I intend to do."

V.

"The thing I like about Paris," Jocarter declared, "is it's so easy to get from there to anywheres else." He turned from the pantopen that inked the stratoflivver's course on a slowly unrolling chart. "If you lay out a hemisphere that takes in about eighty percent of the Earth's land surface, the Dome will be right in its center."

"So the average required range of our Lamp and Neural Current circuits is at a minimum." Stanrod wriggled his spine into a more comfortable position on the frayed cushions. "Why else do you think we were spotted there?"

"I didn't think — sort of had an idea, I guess; it was just because the burg was mashed so flat during the Battle of Europe there was no

percentage in rebuilding it even if there was anyone left alive who'd care if it was rebuilt or not."

"You didn't think is right," Stan grinned. "Didn't it occur to you that there were plenty of Wastelands everywhere, between the way the dust bowls spread during the twenty-first century and the rural areas were abandoned as Vitriculture made natural agriculture uneconomic, to make all the trouble they went to preparing the site kind of silly if all they wanted was empty space— Come to think of it, though, there is something gruesomely symbolic about the location at that."

"Yeh." Jocarter's aquiline countenance was abruptly shadowed. "Yeh. The Dome is sort of like a monument over the grave of four million humans."

"And a solemn promise to them that we won't ever let it happen again— Cripes!" Stan chuckled. "How'd we get off on this track? Look, Jo. What say we make for the airpolo game when we light in Nyork? The chatter of the crowds there ought to give us a line on what's bluing the City."

"O.K. by me. This jalopy's slow enough, bless its decrepit blast tubes, but it ought to get us to Peekskill Park in time for the first chukker. Who's playing the Dodgers?"

"Cairo, and what a sweet team that is. They'll cop the pennant in a breeze."

"If dem Bumbs drop dead, you mean."

"Bums is right," Stanrod guffawed. "What've they got that rates them with the Gyppies?"

"The best forward line in the Intercity League, that's what. And a goal plane you need a heloidal cannon to get the balloon past." Jocarter grew red-faced. "I'll grant you Cairo's Right-two, this what's his name—?"

"Abdul."

"This Abdul's a terrific wingman on the attack—"

"Ye're tootin' he is. And what about the defense the Mahmud brothers put up?"

"Nuts! Brooklyn's Number Three with Geraghty piloting and Luscan on left wing 'll go through them like a gamma ray through a slab of green cheese."

"It might if Luscan was on the wing but he was hurt yest— Holy apples!" Stanrod broke off. "That's it! Am I dumb! That's the answer, of course!"

"The answer to what?" Jo asked, with the little beginnings of a grin.

"The blue shift. With all Nyork airpolo crazy and the Dodgers best for'd wingman out of action for the season, naturally there was a shift!"

"You don't say."

"Well, sure! Why, excitement over this is enough to—hey! You knew about this all the time!"

"I did?"

"Why, you old so-and-such! Why didn't you say you wanted to go to the game instead of pulling all this rigmarole about wanting to help me investigate a blue shift?"

Jocarter laughed quickly, and then his rather austere face sobered. "To be frank, I was mostly interested in exactly what you thought caused the shift to the blue."

"What *I* thought? Can't you guess?"

"Stanrod—I know I sound like a kid asking about the birds and the bees, but—I was watching your face as you took over the Nyork Lamp last shift. I can see why any good Lampman should be concerned over a chromen shift — but I don't see why you are so *much* concerned over such a *little* shift. See what I mean? And—" he paused, and gazed thoughtfully down at the Atlantic, turning slowly past so far below—"it isn't the first time I've had the feeling I'm next to something—secret—something *big* that I don't know about. Something to do with Nyork."

"Nonsense!" But Stanrod's laugh was a little forced. "You're a Nyorker and a Lampman. You spend hours every day staring at the Big Town's soul. How could the old burg have any secrets from you?"

"I think, too," Jocarter went on, without a change of puzzled tone, "that you know what it is."

"Do you now! Look, pal; don't fret about it. Maybe you need revitalizing or something. You been working too hard. Let's get on to the game, and enjoy it, and get back to our business."

"I'm not satisfied," said Jocarter. I'm not, blast it. You were too relieved when you realized it was *only* the game that was causing the blue shift."

"Ah, forget it."

But Jocarter would not forget it, and during the rest of the flight a heavy and uncomfortable silence held between the two.

VI.

Gregor Gregorieff, as adept a pilot as he was cook, valet and general factotum, set Ivan Plovitch's sleek skyacht down so gently the sterterus rhythm of Ivan's snores was not disturbed. Gregor braked, stretched the kinks out of his huge limbs and the muscular barrel of a body to which they were attached, bent to draw on the calf-length, tasseled red boots he'd kicked off the instant a glance over his shoulder had told him Plovitch was asleep.

He straightened again, adjusted the jewel-encrusted dirk in the scarlet sash that encircled his skirted white kaftan, combed fingers through the auburn luxuriance of his beard. Next, scowling with distaste, he plucked a furred Cossack cap from its perch on a ruby-handled lever, donned it and, arrayed now in accordance with Ivan Plovitch's somewhat peculiar concept of the aesthetic, heaved erect and lumbered back to where the latter, sprawled with lolling jaw in the latex-foam embrace of an armchair, presented a not altogether aesthetic spectacle.

Plovitch awoke in a convulsion of splutters and snorts that might have alarmed one less familiar with the process than the Muscovite giant. "Wha — what's it?" he gurgled, floundering upright. "Whassa-matter?"

"We have arrived, *panya* Plovitch."

"Arrived? Where?"

"Paris, *panya.*"

Plovitch shook the cobwebs from his brain. "*Voshe moi,* Gregor! Must I remind you again not to address me as *panya?* I am not your master, nor you my servant. Can't you get it through your thick skull that all Irkutskans are equals, each serving the other and the State in his own way?"

"Forgive me," the bearded giant rumbled meekly. "I will try to remember."

"See that you do. *Spdvostva!* My mouth tastes as if something crawled into it and died. Long ago. Give me some *zubrovka,* Gregor, to cleanse it."

"Yes, *panya.*"

"And have some yourself," Ivan commanded.

The whole idea was a mistake. One pony of the aromatic, and fiery, liquor called for another, the second for a third. When the bout finally ended and Plovitch descended from the skyacht, he had to hold tightly to Gregor's arm against the obstreperous heaving of the slate-hued stone plain.

He gazed owlishly about him. "Flat," he pronounced judgment. "Too flat. Don't like it."

He probably would have liked the featureless and desolate expanse still less had he been familiar with a certain report of the Intercity Commission for the Construction of a World Peace Center that lies buried in the S.C.B.'s archives. Most who served on the I.C.W.P.C. have long ago blacked out, but there are a few superannuants who still see in their nightmares the concrete and brick and twisted steel of a blasted city melt and flow together, lavalike, to form this plain. There are one or two ancients who have never quite gotten out of their nostrils the stench of burning wood — and of human flesh and bones.

"I like mountains," Ivan Plovitch mumbled, "an' "—he let go of Gregor, made sweeping, descriptive gestures—"an' high buildings."

"There is a high building, *panya.*" The Cossack pointed. "Higher and bigger than any in Irkutsk."

Plovitch turned uncertainly, stared, closed his eyes and opened them and stared again. "No," he declared. "Thass no building. Thassa mountain."

"Good, *panya.*" Gregor gravely studied the monstrous loom that gleamed metallically in the rays of the lowering sun. "If you say mountain it must be, but I never saw a mountain with men going in and out."

"Not men, Gregor. Ants."

This was a little too much for Gregor to take. Tugging fiercely at an orange-tinted, fierce mustache wing, he roared: "NOT ANTS. MEN."

Plovitch withstood the blast with admirable fortitude. "Ants," he stated.

"*Men.*"

"Ants."

"You seem to be having a little difficulty, gentlemen," someone said behind them. "Can I be of any assistance?"

He was young, gaunt in his

closely fitted blue-green uniform, his aquiline countenance sultry. "You cer'nly can, comrade," Plovitch told him. "Kin'ly inform this obstinate idiot it is ants that inhabit that enormous building."

"Mountain," Gregor corrected. "You said yourself it is a mountain, *panya*. But they are men. Are they not men such as you and I, *tovarish?*"

A smile tugged at the corner of the newcomer's bitter mouth. "They do look like ants from here, but they really are men. And that is not a mountain. It's the Peace Dome."

"The Peace Dome," Plovitch echoed. "You see, Gregor. I was right."

"Yes, *panya*— Wait! Didn't you say—?"

"I said it was the Peace Dome," Ivan snapped. He drew himself up with great dignity, somewhat marred by a gentle sway. "I, comrade, am Ivan Alexis Plovitch, Commissar for Cultural Welfare of the Sovereign City-State of Irkutsk."

"I'm Natlane. Lampman Chi Lamp, Shift Three."

"A Lampman!" Ivan boggled. "You hear, Gregor? This comrade is a Slave of the Lamp. He contracts his name like all Lampmen." He made a pass at Natlane's arm, missed, managed to catch it the next time it came around. "You and I have a great deal to talk about, *tovarish*. You must tell me all the details of your life here, how you work, what your living conditions are, what you do with your leisure. Everything. Come. Let us sit down over a tumbler of tea and begin."

Annoyance was beginning to replace Natlane's initial amusement. "Sorry. I have work to do. Some other time, perhaps."

"No time like the present," Plovitch declared. "But don't let me interfere with your plans. No. I insist. I wouldn't think of it. I'll just go along and chat with you while you work. First, however, must drink a toast to our meeting and the great things that shall come out of it. Gregor! *Zubrovka* for *tovarish* Natlane! And one for me, of course."

Now, *zubrovka* is ethyl alcohol, a hundred and fifteen proof, but it is smooth as velvet and the aromatic herbs with which it is flavored conceal its demoniacal potency. After his second pony, Natlane found himself quite unable to resist the Irkutskan's renewed invitation to enter the skyacht and make himself comfortable.

And talk.

Ivan Plovitch sat down in a foamex relaxer with a wheeze of *zubrovka* fumes that was almost visible.

"I," he intoned solemnly, "am an aesthete, *tovarish*. A functional aesthete."

Natlane smiled. "And what, sir, is a functional aesthete?"

"As Commissar of Cultural Welfare, my good friend and equal . . . ah, now . . . do not bandy the point. You *are* my equal. I insist upon it. Gregor is my equal." He beamed benignly. "Gregor! More for *tovarish* Natlane!"

Gregor leaped to obey.

"I have come here to celebrate a triumph, my friend. A triumph of skillful legislation."

"Oh?" said Natlane.

"Over what looked like insuperable odds—the ignorance, you know, of the masses—my edict was passed. Forever, I shall be known as the father, the promulgator of the 'Compulsory Recreation Ukase!'"

"Oh," said Natlane.

"The people of Irkutsk will learn, now, the Fuller Life." Ivan Plovitch's voice put in the capital letters. "Now, thanks to me, they will learn the true happiness. Now they may—they must! sit before their telescreens and be enthralled by the classics of music and the dance. Now they will learn the ecstasies inherent in a colorlite symphony, be carried out of themselves by the masters of perfume-harmony. The man who cannot appreciate these has progressed little farther along the scale of evolution than the beasts. It is the duty of each of us to our race to elevate every member of it to this sublime state. If we fail in this, we have failed in our duty to ourselves. Are you beginning to see what I mean by the phrase 'Functional aesthete?'"

"I believe I am," said Natlane. He did not know whether to be amused or annoyed. He had never run across anyone quite like this before. There was little commerce between City-States, and he had believed that any consideration of humanity as a whole was limited to the integrating officials at the Dome. His strange and disquieting conversation with Van Gooch flicked through his mind and he said, "The post of Commissar of Cultural Welfare—it carries a good deal of . . . er . . . power?"

"Power, comrade? I dislike the word. I am no seeker after power. Let us say rather that my guidance is appreciated." He swelled the upper part of his stomach, to which he probably referred as a chest. "Why, only yesterday it came to my ears that one Misha Litoff—a hydroponics expert, who has gone to a great deal of trouble to develop lemons to my liking, for tea, you know—has said in a public place that I have the most delicate and informed taste in all Irkutsk. Obviously a man of intelligence and sensitivity. *Brrp.* I beg your pardon. I was happy to have it in my power to support him successfully in his appointment as Commissar of Hydroponics. You see, I have been able to convince the Council of Irkutsk—a willing group of louts—that food and aesthetics are very closely allied. And gradually I have been able to control—lead, that is—most of the food industries; a situation which has placed me on the council, which position, in turn, has made possible this latest triumph—the Compulsory Recreation Ukase."

"I see," said Natlane. He sipped thoughtfully. "And of what does this ukase consist?"

"It is an order," said Ivan Plovitch proudly, "which gives my division complete authority over the leisure time of all of Irkutsk's

citizenry." He tossed off an amount of firewater that made Natlane wince just to watch him, held out the tumbler absently while the ubiquitous Gregor refilled it. "A crime, *tovarish!* A sinful waste! These co-citizens of mine were permitted to be free to do anything they wished—their cultural tastes throttled by their beastly instincts for such things as dancing with each other—dancing, comrade, not The Dance—reading cheap literature, attending light, escapist cine-solidographs, and the like. I have put a stop to that! Now the people may indulge their better selves."

The liquor made Natlane incautious enough to ask if the people *wanted* to indulge their better selves.

"Want?" Ivan Plovitch stormed. "Want? What does it matter what they want? They are men—*men*, that is; and they must be treated like men. If they have no cultural capabilities, they are not men, they are dogs! There are those among them who seem to object to the program, it is true; but they will learn. They will either appreciate their new elevation, or they will be put where they cannot be heard."

Natlane opened his mouth to say something at this point, but Ivan Plovitch roared him down. Finding his mouth open, therefore, Natlane emptied his glass into it.

"They are as good as I," bellowed the Irkutskan. "I insist on the basic equality of all humankind! And since I have these cultural proclivities, they have them too, and"—he pounded on the noiseless arm of the relaxer—*"those tastes shall be catered to!"*

"O. K., O. K.," said Natlane placatingly. "If that's the way you do things in Irkutsk, it's all right with me."

"Ahh. In Irkutsk," crooned Ivan softly. "Now we come to the point of my visit."

"Celebration, didn't you say?"

"I celebrate, comrade, by carrying this great gift to the world. I have come to liberate you Slaves of the Lamp from your chains."

"Huh?"

"Oh yes. I have heard of the drab lives you lead. You spend your working hours crouched over those fiendish Hoskins Lamps without any music to alleviate the awful tedium or a phonobook to expand your mental horizons. And in your time off, you actually go in for further research and experiment on your task, so tragically hypnotized are you in the inartistic business of drugging our drinking water, gassing our air, radiating neural currents, all for the honor and glory of the Sociological Control Board!"

"Now, wait a minute, bud—"

"Sociologists?" thundered Plovitch. "Greasy-handed mechanics! Mechanics, that is. No concern for the dignity of the human soul." He stopped in surprise as Natlane's head went back to give free egress to roars of laughter.

Natlane couldn't help it. A swirl of resentment, based on his ingrained loyalty to the Peace Dome

and its work, had been transmuted to a vast amusement by Plovitch's unutterable pomposity. And possibly by the aromatic refreshment, a little. Tears streaming down his face, he finally apologized sufficiently to change Ivan Plovitch's face from purple back to its original cerise.

And in hunting for a presentable reason for his outburst, Natlane found himself talking about the thing of greatest importance to him —talking, and talking. Perhaps the liquor had something to do with that too. It was so-o-o much easier to talk than to move.

Rudolph van Gooch sat in silent meditation in the glittering, empty hall. His skeletal hands lay relaxed over the serried buttons on the arms of his chair—buttons that could order the lives, and often the very thoughts of the men and women under his command.

He liked the feel of those buttons. More than his insigne, more than the deference he received from those about him, he felt that these buttons were his badge of office—a concreted statement of authority.

Natlane— A pity, that the most dynamic young mind among the hand-picked personnel at the Dome should show all of the symptoms of that dread disease, power-madness. Poor, deluded youngster! He was obviously certain that he had found the way to save humanity from itself. Well, most wide-awake young men did go through that. Unfortunately—Natlane was right. If he proceeded, he *would* cure humanity's ills.

Rudolph van Gooch was a very wise man—wise beyond even his advanced years. And he had the wisdom to be able to evaluate his own worth to humanity. He had done pretty well. Pretty well. He had kept the sleeping giant asleep; and perhaps humanity had advanced a little toward the state where it would be fit to govern itself. But not yet. Not yet, nor would they be ready in the three generations that Natlane's idea would need to root itself. And in the meantime —where would he find a successor? Where to find a man who, like himself, could be trusted to think always of mankind as a whole, and never of himself as the Master?

He sighed regretfully. Young Natlane was made of the stuff of which leaders are composed. Even now, Natlane truly believed that his motivations were altruistic. It had almost certainly not occurred to him that if his experiments succeeded —and they would—he would have limitless power over the race—more than Van Gooch himself —more than the Peace Dome. And, Natlane being what he was, he would gradually begin to cloud his logic. He would begin to feel that the world was persecutmg him, trying to force him to swerve from the way of ruling the earth that he, Natlane, Lord of All, felt was the right way. And then would come the fears, the undercover preparations for a possible attack on him, and finally the adamant

cruelties of a dictator—for what? For what? For the good of humanity, of course. Only for their good. Oh, the pathetic self-delusion of power!

Van Gooch sighed again. It would be difficult, for Natlane was young and strong—stronger than he himself yet realized. But he must be stopped. He must be stopped quickly, before he brought ultimate disaster upon the world, and upon himself.

Tremblingly, then, Van Gooch lifted his frail body from the chair, and, ignoring the push buttons on his chair, crossed the vast chamber and went unerringly to a place on the featureless wall. He touched it, high, and again a little to the right. Silently a section of panel, barely 20 cm square, receded, exposing a stud. He pressed it and withdrew his hand, and the panel closed again. Walking back to his chair, he reflected that it would indeed be a convenience to have this particular circuit on the arm of the chair; but he had long ago determined to keep it quite separate from all the others.

He sat down, and in a moment a whisper came from above and behind him. It said: *"Que voulez-vous?"*

And, regretfully, in an antique tongue, Rudolph van Gooch gave his orders.

VII.

Natlane lay back in the soft chair with his legs stretched out in front of him and watched his toes swim past in recurrent arcs. "You're right, m'friends," he told them. "You're absolutely right." The whole thing was crystal clear now. He wondered that he could have entertained even a moment's doubt that his new experiment-line would pan out. "Only way to tackle a problem is start at beginning. Condition embryo 'gainst 'vironmental influences." A russet mustached blur drifted into his ken and he impaled it on the tip of an immensely long forefinger. "You! Ivan Plitch! How would *you* go 'bout conditioning human embryo?"

"I'm sure I don't know, comrade."

"Zackly," Natlane leered. "You don' know but I do. Secret," he whispered, loudly enough to have been heard across the tarmac if they'd not been within the skyacht's luxurious enclave. "Expose blastula to various physical stimuli governing temperamental reactions. Minute doses at first, zen gradually greater as it dvelopes. See? Build up natural resistance, same idea 'sgetting inured to sunburn."

"Bozhe moi!" Ivan boggled. "It might work."

"Betchur sweet life it'll work." Nat tried to focus on his still extended finger, gave it up as a bad job. "How do I know? 'Cause I've 'sperimented on rabbit eggs already. Thousan's an' thousan's vrabbit eggs." He pulled the finger down with his other hand. "Wouldn't do to produce monsters, would it?"

"No," Ivan agreed, "no, it wouldn't. But tell me, comrade. How would you react if I were to propose the establishment of a University—?"

"React?" Nat's brow furrowed as he considered. "Why should mothers react unfavorably? Excorporal maturation's been practiced a half cent . . . half cench . . . over fifty years now."

"What's that?" Gregor demanded from kilometers above him. "That excorp— What you said."

"Excorporal maturation? Development of foetus outside maternal body. Greatest boon to womankind ever devised. Ovum removed from mother soon's fertilized, n' essential nutrients supplied artificially. Obviates discomforts, pain, dangers of childbearing. Don't tell me you never heard of it."

"Naturally I have heard of it," the giant declared, affronted. "It's what they do in the Mother Houses."

"Now you got it! Hold it. Hold on to it in that fist." Nat pointed to one great-knuckled hand. Now take this in th'other— No." He peered at the demidekaliter jug Gregor balanced in the hollow of his arm. "You've got somethin' in it. Wouldn't be *zubrovka* by any chance?"

"Yes, comrade, it is."

"Then pour me a modicum, if

you please," he said with studied precision.

The Cossack grunted, tipped a 4 cc dram of the light greenish liquid into a tiny pony so deftly that not a drop spilled. The Lampman took it, blinked at it. "Great stuff," he averred. "Real stuff!"

"Yes," Plovitch assented. "Now, about this University. As I was saying—"

"As *I* was saying," his guest interrupted, "all they do in Mother Houses is reproduce exactly natural prenatal conditions. What I propose is to expose blastula to various physical stimuli—"

"You said that before."

"So I did." He nodded gravely. "Amounts to control *ab initio,* you see. 'Smy idea. Stroke of genius, isn't it?"

"Well—"

"All right. Ask me 'bout genes. Go on. Ask me."

Ivan looked helplessly up at his bearded servant's impassive countenance, spread eloquent hands. "Very well," he sighed resignedly. "What about genes?"

Natlane curled his lip. "Don' enter into question atall. Genes determine physical characteristics, see. Shape. Height. Color, heir-skin eyes. O. K. Cerebral conconvol . . . wrinkles of brain govern mental capacity, intelligence level, grant you even special talents, but it's a superstition that they transmit ancestral memory, racial prejudices or even what we call temperament from progenitor to progeny."

"Progenitor to progeny," he repeated. It was a good phrase. He'd never been able to speak so succinctly, to think so precisely. "Theory of acquired—*inheritance* acquired characteristics, physical *or* mental, 'sploded long ago. 'Sall environmental. Look. Infant loves mother. Instinct, you say. I say babe's learned mother's smell, color, taste, means protection, comfort, food. See? Ed-education. Begins moment of birth. Mother screams when she sees snake—baby hates snakes from zen on. Father distrusts people different color skin. Child distrusts people different color skin. You get me?"

"Yes, comrade," Plovitch said weakly. "Now, *tovarish.* About your working conditions—"

"Jus' minute." Natlane had discovered the pony he was holding. "Got to have drink." He got it to his mouth, drained it at a single gulp.

The fluid seemed to evaporate in his mouth. The fire of it ran through his veins, exploded in his brain and he knew beyond doubt he'd found the way at last to meet Riis Narghil's challenge that was emblazoned on the wall of the Dome. But he must convince this new-found friend who amazingly was unable to understand the simple beauty of his plan.

Tactfully. "You're right, Ivan. I admit you're right. We don't n e e d ex-excorporal maturation merely to obviate educational influences. Take . . . take infant 'way from mother at instant of birth s'fficient for that. But what

about effect of prenatal environment, huh?"

"Very interesting." Ivan tugged at his mustache. "Most interesting, comrade. But—"

"But we don't know if there is any such effect. Right!"

"—what I would like you tell me, just now—"

"Why bother about it? Zackly because we don't know is there or isn't there effect. So by obviating it, we're sure it won't interfere. An' zen, we haven't trouble persuading mother t'leave infant in our care. She hasn't developed attachment to it. How 'bout 'nother I'il drink, Gregor?"

Gregor shrugged, filled the pony, and this time Natlane disposed of its contents without hesitation. "O. K.," he launched back into his exposition. "So we've got human egg in cultural medium, just couple cells right where I can get at it. Right where it's simple matter to condition it *ab initio*. See?"

Ivan sighed.

"Foetus is developing in nutrient medium I provide. O. K. So I find out what salt'll make it impervious to cosmic rays, f'rinstance. F'rinstance I discover that exposure to certain radiations make it insusceptible to the irritation of protracted heat— This is rabbit egg, y'unnerstan? More rabbit eggs. I'm not ready for human ova yet."

Plovitch was persistent if nothing else. "You must tell me more about all this some other time, comrade Natlane. I—"

"Time? Cern'lly it'll take time, but not s'much as you think. If hydroponists can ripen vegetables in days instead of months, why can't I speed growth of mammals in same proportion? Answer is, I can and have. Sure I need thousan's more 'speriments on rabbits, but can do in a year or so. Zen, knowing all factors, I start on humans. I condition ova, grow them to mature men, women, in two, three years. Give 'em intensive scientific education, facts only, no prejudices. Give 'em intensive instruction in logical thinking. What've I got? A new race, without prejudices, impervious to physical determinants that have made so sorry a mess of what we proudly call civilization. In a decade I shall have created a hundred, a thousand, superhumans, Adams an' Eves of a new super race that in a few generations will dominate the Earth."

Natlane spread his arms triumphantly. "There you are. There's your blueprint for a world ruled by pure reason. What do you think of it?"

Ivan Plovitch's small eyes suddenly grew even smaller, and a mixture of emotions suffused his face—exultance, curiosity, and, most of all, a consuming eagerness. "Natlane, my good, new friend! You are indeed a talented fellow. You say you have had some measure of success in this project?"

"Success? Why certn'y! Last batch vrabbit eggs impervious to everything but 'specially high beta particles. I think I can fix that,

too. Not stop particles. Minimize effect of particles."

"Yes, yes, my friend. And you have had recognition of your work?"

"Recognition? Heh! Why, the commander in chief himself called me into his headquarters on'y this morning to talk to me about it." There was something about that—what was it? Oh-oh. Misery and resentment descended on him. "An' we're having a union meeting tonight and I'm gonna make the SCB give me everything I want to finish the work."

"Union? You have a strong union?"

"Strongest there is, an' they'll back me up, you bet."

Inspiration added itself to the excitement on the Irkutskan's face. "Wait, comrade! I should like to . . . is it possible that I could address the union myself?"

"Wanna talk to union, Plitchy, ol' boy? Why sure! Any friend of mine is a friend of mine. Yes, sir! You just come along to the ol' meeting, an' I'll fix you up with Olejensen, the best li'l ol' chairman you ever saw. Pleasure!" He rose and tried to click his heels. Instead the click registered, and violently, in between his ears. He groaned. "Wh-what time is it?"

Plovitch looked at Gregor. "What time is it?"

Gregor looked at the perpetual radium clock over Plovitch's head. "Ten minutes after seven, *panya*."

"Ten minutes after seven," Plovitch told Natlane.

"Ten minutes after seven," Natlane echoed. "Got to go eat." He let go of the chair, grabbed it again. "Got to go to Refectory to eat."

Plovitch accomplished the astonishing feat of leaping up and coming over to Natlane. He put his arm over the Lampman's shoulders possessively. "No reason for you to go anywhere to eat, *tovarish*. Not while Gregor's galley is stocked as well as I know it must be. Dine with me and then we shall drive to the meeting together."

"Don' mind if I do," said Natlane, and sank wearily back into the relaxer.

VIII.

"A hundredth chromen," said Jocarter, wonderingly, as the two Lampmen elbowed their way through the crowds leaving the gigantic Polodrome. "Gosh—I got excited enough during the game to drive my Lamp as blue as a lovebird without its mate—all by myself!"

Stanrod laughed. The tension between him and his friend had been eased by the spectacle of the game, in which Dem Bums had come through with a two-point lead gained in the last eighteen seconds of play. It had cost them three planes, but no lives, and every Nyorker was delirious. "Well, be glad it was only the game," he said.

Jocarter stopped. "Now what do you mean by that?"

"Why do I have to *mean* something?" snapped Stanrod irritably. His good-natured, blunt face softened. "Heck, Jo, all I meant

was what I said. It's a good thing it was something as harmless as the game that blued us, that's all."

"What else would there be?"

"You talk like a man with a paper nose in a forest fire. You know what throws the Lamps out of chromic balance. You went to the SCB school. Wars and rumors of war—or didn't your folks tell you?"

"I'm not satisfied, Stan. You're hiding something."

"Aw, for—" Just then a man bumped into Stanrod, apologized, double took, and said, in a chesty voice—"Hiya, Stanrod!"

"Well, Gar Whitney! Hiya, boy?"

"In for very long?"

"Just a shift. Meet my second-shift spell, Jocarter."

"Very pleased to— Oh," Gar Whitney finished in astonishment as Jocarter turned his back.

Stan put a hand on his arm, swung him about. "Now look, chum; you must have a powerfully good reason for a thing like that."

"Unless I'm mistaken," said Jo stiffly, talking directly past Whitney to Stanrod, "one Gar Whitney was psyched a few years ago for a series of warlike speeches, advocating the maintenance of an armed defense force. He was also the author of a popular novel which had the same idea as its theme. It could not be suppressed, but it is and always will be a menace to the operation of the Dome. I would like to believe that he is no friend of yours."

"Now this," said Stanrod, "is the payoff. Jocarter, you're a nice guy but you're a babe in the woods."

"Jocarter," said Whitney, evenly, "you haven't heard anything about me and my ideas for quite a few years, now have you? I sounded off a good deal when I was younger, but—"

"—but there's no telling what subversive work you've been up to since you stopped talking too much," said Jocarter, flatly. "I'd much rather not talk about it. Come on, Stan." And he strode off.

"Well, cut off my shorts and call me Leggy," breathed Whitney.

"Look, Gar," said Stanrod. He spoke quickly. "I know Jo well. He's a grand guy, but he's been sheltered all his life. However, he's smart. It so happens that meeting you like this is part of a whole series of breaks that have given him a hint of The Work. He won't stop now until he finds out everything; and if he does, I hate to think of what he'll do with the information."

"That won't do. That won't work a tall. What to do, Stan? We can't let him go ahead, if what you say is true. But we can't kidnap a full-fledged Lampman either."

"This particular bull hereby gets took by the horns," said Stanrod through his teeth. "We'll get him to a drinkery and give him the whole story. No man with any intelligence will move against The Work once he knows the score, I hope."

"I hope, too."

They loped after the stiff-backed Jocarter.

Stubby's wings retracted, cushioned wheels hissing, Ivan Plovitch's yacht sat down on the Paris tarmac. As it swung to taxi, its powerful lights swept over the deep Seine ravine, where the green-slimed, muttering river wandered all but forgotten; over a dark-clad trio flattened inconspicuously against the long wall of the communal Refectory, and probed the Plaza.

Had Natlane not been somnolently replete with caviar and borscht, pirogen and sashlik and lakes of scalding tea, he might have noticed the three black-swathed figures and wondered why they watched so intently the streams of strollers from Refectory, the Recreation Building and Dormitories, all of whom had to pass their vantage point on the way to the evening's meeting.

The pungent and exotic meal had gone far to sober the Lampman. Only a dull headache, indeed, and a fuzziness of tongue remained to remind him of his bout with *zubrovka.*

"O. K., Gregor," he called. "This is where we get off."

The union hall was by far the most imposing of the Plaza's buildings, an ovoid of creamy structural plastic effulgent with warm luminance. Above the wide portal a bas-relief, bathed in golden light, represented the massed workers of the world climbing toilfully up the sides of a high mountain to meet with clasped hands and radiant countenances on its peak. Beneath this three men, about to enter, turned curiously to Natlane's call.

Hand on Plovitch's arm, the Lampman guided the Irkutskan to them. "The heads of the union," he explained sotto voce, and then he was making the introductions. "Commissar Plovitch of Irkutsk, gentlemen. This is our president, Ivan. Olejensen." A blond viking with eyes the blue of a summer sky at noon. "Our secretary, Paulkruger of Capetown and our finance officer, Niyakima. Niyakima's Expert for Kobe and I can tell you he's kept twice as busy as any of the others, stemming his people's aggressiveness."

"I don't wonder," Ivan murmured and Nat thought he detected a stiffening of the Irkutskan's back, a slight hesitance before he took the yellow man's extended hand. "Your co-citizens have a long history of truculent behavior." *This* was the sort of thing, nursing of old grievances, ancient resentments, that Natlane was determined to extirpate. "And of . . . may I say bad faith?"

Niyakima's breath hissed in between his small, sharp teeth. "So sorry must admit impeachment," he murmured, eyes black agate between their slanted lids. "But all that of the past now. No reason for truculence since all Cities have attained happy condition of closed economy."

"No," Ivan acquiesced. "No reason," and turned to Olejensen. "I should like the opportunity to

address your meeting on a matter of decided interest and even, I may say, of extreme importance. I have a message—" Natlane's attention was distracted by a plucking of fingers at his sleeve. It was a girl, her face shadowed within a peaked hood. The tip of a tawny tress curled on her neck and Nat knew who she was.

"Marilee!" he exclaimed. "It's great to—" was cut off by a low, "*shhh.*"

"I must speak to you." He could barely hear her. "I've got something to tell you." There was a tremor of excitement in her voice, and apprehension in the way her head twisted to glance over her shoulder. "Meet me behind the laboratory wing."

She was gone, screened from him by the thickening crowds that converged on the hall. ". . . pleasure to have so distinguished a guest address us," Olejensen was telling Plovitch, courteously. The meeting wouldn't be starting for a while. Plenty of time, Natlane decided, to find out what the girl wanted before he'd have a chance to air his grievance.

Luminance from the Plaza entered only a little way into the alley the laboratory wing's sidewalk made with that of the Refectory. Marilee was waiting far back, where the shadows were darkest. "Well?" Nat put his hand on her arm. Beneath the soft cloth it was trembling. "What's on your mind?"

"Natlane," she whispered. "You're defying him. You're fighting to go on with your research."

"Yes, I— Hey! You listened in."

"No." The breathed syllable was barely audible. "But I have to keep a record of his orders and the one to the Laboratory Supply. I've been looking all over for you to warn— What's that?"

The hood fell from her head with its abrupt twist and a vagrant ray glinted on her hair. Her eyes, peering past him, were frightened. Natlane spun, saw only the gloomy alley, the glow of soft radiance at its mouth, swung back to Marilee. "There's nothing there."

"I thought I heard . . . I must have been mistaken."

"What's got you jittery, youngster? What's all this you want to warn me against?"

She still gazed apprehensively beyond him. "I don't know, exactly." Her face was pale in the half light, in the hollow of her throat there was a flutter like the heart of a hand-held bird. "It was my swing shift today, a double stretch. Just before change-over Lenorris, director of the laboratory wing, asked for an interview. He seemed disturbed when he went through my anteroom but I didn't think anything of that till, while he was in with . . . with Van Gooch, the chief spoke to me about something. The cutoff button must have stuck for a second and I heard him say, 'Don't let it worry you, Lenorris. I shall take care of friend Natlane.'"

She paused. "Well," Nat mur-

mured. "Go on. What else did you hear?"

"That's all. The button came unstuck and that was all I heard, but he sounded so grim when he said it, so . . . so *ruthless*." Breath caught. "Don't fight him, Natlane. He's too strong for you."

"I can't understand any of this. It's not like him. But—he's not too strong for the—" A shadow dropped on them from above, enveloped them. It was nothing material. It was a gas, odorless, opaque. Sightless.

Natlane was blinded. He was *paralyzed!* The black cloud sucked will from him. He could not cry out, could not move. He was blind and helpless.

He felt hands take hold of him, lift him. He felt himself laid across a shoulder. There were footfalls in the blackness. His captor was moving and the blackness was moving with him. Natlane was being carried off somewhere but he wasn't frightened. The anger that pounded in his skull left no room for fear.

IX.

From the seat they'd given him on the platform, Ivan Plovitch looked over the audience and knew he'd done well in coming to Paris. Gathered here, row on row, were men and women from every City-State, Latins from Rio, round-faced, impassive Orientals of Chungking, Monrovia's Negroes, lank representatives of a dozen North American cities, obese Munichan burghers.

Here before him was the world in miniature, all the races of mankind gathered to hear his message.

Let him convert these to his credo of the more abundant life and he would have demonstrated that nowhere on Earth would it be rejected. Ivan smiled inwardly. He could convert them, never fear. No one as yet had been able to resist the spell of his oratory, the flaming rightness of his Cause. And now, with Natlane's work—

Paulkruger, burly, dark eyes darkly eaved, droned through the minutes of the last meeting. Niyakama, the Kobean, read in high, mincing tones a dry financial statement. Ivan occupied himself with picking out the listener at whom he would talk. Perhaps that round-faced, olive-skinned little fellow like a nervous Buddha in the front center of the hall. No. His mind wasn't on what was going on. He kept bobbing up to peer at the back of the room where some latecomers still straggled in, to scan those already seated. If he kept that up while Plovitch talked, he would be disturbing.

On the other hand, if the Delhian's attention was riveted, the speaker would know he'd taken hold of the others, had them listening enthralled.

Motions were made from the floor. There was talk. Votes. All of it was a meaningless jumble of sound that flowed over Ivan as he polished his talk, tested one phrase against another, strove to recall a particularly telling parable he'd

once used before the Duma—Someone was tugging at his shoulder from behind! Gregor.

"Panya," the Cossack whispered. "Something strange has happened to *tovarish* Natlane. I was sitting in the yacht and I saw—"

"Durak!" Ivan broke in, flaring. "Fool! You dare bother me about that besotted idiot when I'm about to make the greatest speech of my life?"

"But I tell you I saw him carried off in a little black cloud. It went across the Plaza and—"

"Absurd!" Plovitch snorted. "Black cloud indeed. You've been swilling to pass the time away, and—"

"But—"

"Get out of here, you drunken *mujik!* Get out before I have you thrown out!"

"As you say, *panya.*" The bearded giant backed away and disappeared through a small door at the rear of the platform, but he had broken his master's concentration. "If no one has a grievance to bring before us," Olejensen was saying, "we shall proceed to—"

"Brother President!" The rotund little Delhian popped up. "May I be recognized?"

"Brother Ganehru," Olejensen named him and sat down.

The sloe eyes searched the room once more, desperately, and came back to the rostrum. "Brother President," he said in his too-precise language, "I am not sure that I am properly in order at this juncture. The grievance of which I wish to speak is not mine, but that of a brother member, who appears not to be present—inexplicably, I might add."

"You know our by-laws, Brother Ganehru," said the Chair. "Complaints may be brought before this body only by the member concerned."

"I realize that, Mr. Chairman." Ganehru smiled placatingly. "However, this is a matter of the gravest importance to every person here. I am witness to evidence of a certain order, originating in the office of our respected chief of staff, that indubitably violates the most important clause of our basic contract with the Sociological Control Board."

There was a stir of attention. "In that case," Olejensen sighed, "I shall reserve my ruling until you have stated the case. Proceed."

The Delhian's flabby chins quivered and his pudgy fingers twisted at one another. The man's suffering from stage fright, Ivan thought. He would have welcomed being ruled out of order but his conscience drove him to call for the floor.

"Brother President," Ganehru found his voice again. "Brother fellow members Amalgamated Union Psychoneers of the Sociological Control Board. Article Twenty-four, section b, subsection little three of basic contract provides as follows: 'Suitable facilities shall be provided by the Board to each and every member of the Union for the pursuit of such research projects as such member shall desire to pursue during said

member's leisure period,' or words to same effect.

"Now, fellow members. Purely by a coincidental accident I happened to be present when Lampman Natlane, a member in good standing of said Union, was denied a certain plastic required by said Natlane for a certain research project, and was informed that such denial was at the order of and on behest of Rudolf van Gooch, chief of staff of said board. To wit: It is my belief that such order and behest is in direct contradistinction and repugnant to above quoted article, section and subsection, and submit that unless same is at once protested by motion duly made and seconded in manner prescribed by Constitution, it will as I have hereinbefore stated, constitute a precedent in derogation and abrogation of aforementioned Article Twenty-four, section b, subsection little three of the basic contract between—"

"The member is in order," Olejensen broke in on the sentence that otherwise might have gone on and on to the end of time. "The Chair takes the liberty of stating that it feels the point is well taken. Do I hear a motion that the Executive Committee be instructed to investigate the brother's grievance and to protest it if it finds the situation as he has stated?"

Ganehru's mouth opened but someone in the rear shouted, "So move!" and a half-dozen cried, "Second!" before a sound could come from it. "Any discussion?" Olejensen asked, but Ivan caught his nod to the heavy-set fellow in the front row who bawled, "Question! Brother President. I move the question."

"Second!"

The motion was put and passed while the dazed Hindu still gaped bewildered. "So ordered," Olejensen announced. The man, Ivan thought, is such a presiding officer as parliamentarians dream of. The proposition was too obvious to require debate, why waste time on it?

"And now, brother members," he was saying, "I have the pleasure of introducing a visitor with whose accomplishments you are all familiar. Alexis Ivan . . . I beg pardon . . . Ivan Alexis Plovitch, Commissar for . . . for—"

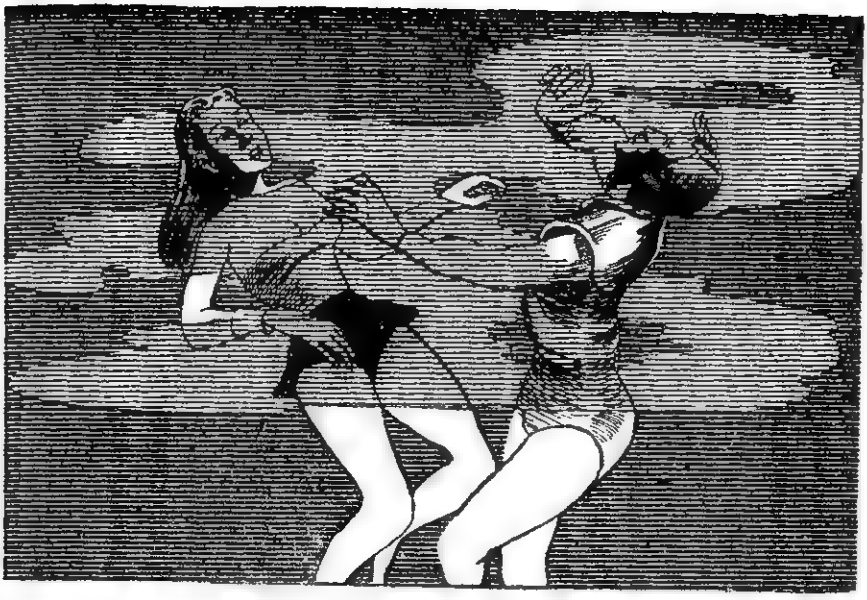
"Cultural Welfare," Ivan told him, coming forward.

"For Cultural Welfare, of the City-State of Irkutsk."

Plovitch was hard put to it not to betray disappointment at the perfunctory spatter of applause. Never mind, he consoled himself, by the time I am through they will be cheering.

"Comrades," he began. "I bring you a message—No. I bring you a spark that will light such a blaze in your souls as will . . ."

Natlane was still blinded by the black vapor that had deprived him of will, but he knew that he had been carried through the open and then into some close-walled interior. He dangled over a hard shoulder, head and arms lolling, an arm clamped across the back of his



knees. He was being carried down and down, a slope, spiraling stairs.

Odors penetrated the cloud, a smell of wet rock, a dank fetor that nauseated. Their progress leveled out. It seemed to Nat that he was being borne along a passage with many twistings, its floor broken, slippery. A final sharp turn and he was being lifted down off the shoulder, was laid on some unyielding, rough surface.

The stench now was unendurable. The footsteps went away from him. There was a ponderous thud. There was silence.

". . . And so, comrades," Ivan Plovitch launched into his peroration, "this is the message I have brought you. You must no longer plod the treadmill of dull, daily routine, no longer bind your God-given souls to the stodgy tasks that are but the means by which you earn your livelihood. Cease devoting your leisure to merely other phases of the same occupation in which your four stated hours of labor are spent."

He held out to them embracing, appealing, arms. "Oh, my comrades. Let me lead you to the summits where the poets await you with their celestial ambrosia. Let me guide you to the dells where Pan draws sweet music from his reeds. Strike off the chains you have fastened upon yourselves, oh Slaves of the Lamp. Raise your eyes from the mire. Fix your aspirations upon the stars."

Drenched with perspiration, limp, now that the need for breath was

over, gasping, Ivan slowly, lingeringly lowered his arms.

A single pair of palms spatted. Ganehru's. Even that meager applause hesitated. Ceased.

The dead silence, the sea of stone faces, chilled Ivan. He realized their reason. These people were still under the spell of his eloquence. They were too deeply moved for cheers. It was, he told himself, the climactic tribute of his career.

Olejensen came beside him. On one side of the chamber a dour individual rose, his long, narrow face graven with deep lines. The president recognized him. "Brother Robarmstrong of Glasgow."

"Brrother Prresident," the man burred. "I wish to inquire of the speakerr preecisely what he prooposes."

The question might have been planted to lead to the Irkutskah's next step. Nevertheless, as Olejensen turned courteously to him, Ivan was aware of a sinking sensation in his cardiac region. "I suggest first that you adopt a resolution signifying your decision to engage in mental and cultural self-improvement rather than the extension of your labor hour pursuits into your free time. Secondly, I propose that you empower your Executive Committee to co-operate with me in the establishment of a University for the propagation among you of knowledge and appreciation of the Fine Arts.

"Third and last," Ivan said into a clotted hush, "I advise that you incorporate among your by-laws one making matriculation in such a University a requisite condition of membership in this Union, hence of employment by the Sociological Control Board."

Robarmstrong's eyes were the gray of steel and resting on Plovitch's face they had steel's hardness. "Thank you," he said. "We arre grrateful to yeh, Mister Commissar for Culturral Welfare of the City-State of Irrkutsk, for yourr vurry fine speech. Howeverr, I ken I speak for all when I say that yourr proposeetion does not in the least appeal to us. We believe we arre performing a vurry useful function in the worrld, and we intend to continue to perform that function without interrfeerrrence from outsiderrs."

It was true. The Glasgowan was not one benighted man speaking his darkened mind, he had voiced the thought of all. A ripple of applause grew till it was mocking thunder beating at Ivan Plovitch. beating him down.

"Brrother Preesident," Robarmstrong cried, "I move you this meeting be adjourrned."

X.

Jocarter's lips were white. "Let me try to get this all straight," he said in a choked voice. He sat in a booth beside Stanrod. Gar Whitney was opposite.

Gar said, "Take it easy, Jo. I know you've had no inkling of this, and it's a big thing to take in one lump."

"If I understand you correctly,"

Jo said, "you, Whitney, are a . . . a *military* man. You are the head of an organization simply referred to as 'The Work.' You are in command of a fleet of war craft, a stockpile of guns and ammunition, bombs and other weapons, all of which has been built and paid for out of public funds here in the City of Nyork."

"Check," said Stanrod.

Jocarter shook his head, bewildered, horrified. "And I was born here—went to school here—voted and paid taxes here, and I never knew anything about this. I . . . I can't get over it. Financed by tax-book falsification, supported in secret, operated by a . . . a quasi-legal, undercover gang of criminals—"

"Now hold on. Criminals?"

"Certainly! There is no law in the city statutes authorizing such expenditures, in the first place. But the most important thing of all is that it is a direct violation of the letter and spirit of the Pacts of the Peace Dome."

"Now there we have you," said Stanrod. "Glad you brought it up. The Dome was established to make war impossible. 'The Work'—battle fleet and all—was established for precisely the same reason. Nyork has never attacked anybody and never will. And as long as The Work is maintained, no one will ever attack us." He spread his hands. "Q. E. D."

Jocarter turned furiously on him. "You! You call yourself a Lampman! You hypocrite! You have taken a solemn oath to uphold the Laws of the Dome. They particularly specify total disarmament. Yet you have carried this knowledge with you all these years, gone to the Dome, pretended to carry on Hoskins' Plan!"

Stan grinned. "I have, son. Cool down, now. The Dome Law on disarmament calls for the removal of all weapons and ammunition *from any warring city.*" He chuckled. "And Nyork has never been in a war."

"There are thousands of cities which have never been in wars!"

"Therefore there are thousands of cities which are armed," said Gar Whitney gently.

"I don't believe it! I don't believe it! The Lamps would have shown—"

Stanrod finished it for him. "—that cities were arming? No, Jo. The Lamps can't show a thing except a wide emotional upset in any civic group. When an armed force is built, coldly and without excitement, and without the knowledge of the general public, there is obviously no electroneural imbalance for the Hoskins Lamps to pick up."

"But that's . . . that will lead to nothing but another world blowup!"

"Possibly," admitted Gar Whitney grimly. "And if it does, Nyork will not be caught napping. History has repeated, far too often, the tragedy of unpreparedness. In an emergency, the people of a true democracy refuse to realize the danger until it is too late. Nyork has been very fortunate. Now—

it doesn't have to be lucky. It's strong instead. Look at it this way, Jo. As long as The Work is carried on, and kept secret, Nyork can have its cake and eat it, too. It can live in the only way possible for Nyorkers to live—democratically. And it can fight in the only practicable way—under a thoroughly organized, integrated command. The two coexist in peacetime because one of them is underground. In wartime, there would be very little disruption of the peace-time machinery, for it doesn't need to convert. The conversion has been done."

"Jo," said Stanrod, persuasively, "I'm not the hypocrite you seem to think I am. I've been in The Work since I was a kid. The Work was what gave me the international slant on things."

"And now you're a spy for this extra-legal pack of would-be murderers, worrying about a hundredth-chromen shift for fear your precious war mongers will be found out."

"I think, Gar," said Stanrod carefully, "that I have come to the end of my store of sweetness and light. This guy is all psyched up and won't listen to reason."

"He's had a shock," said Whitney, not unkindly. "Jocarter, there's only one way for us to sweat this thing out. If you go back to Paris now, what will you do?"

"*If* I go back? What do you mean *if?* Anyhow—I shall certainly go right to Chief van Gooch with the information, and have this lethal business stopped—here and in any other city on Earth where such potential murder exists."

Stan sighed and leaned back. "Well, Gar?"

Jocarter never saw the tiny hypodermic that knocked him out.

In his aerie beneath the Peace Dome's high roof, Rudolf van Gooch peered over tented fingers at three men who stood before him because there was nowhere they might sit. "Yes," he murmured. "I recall discussing his project with Lampman Natlane. I endeavored to persuade him it was chimerical, but I did not order him to abandon it."

"You misunderstand me, sir." Flanked by Niyakima, Olejensen spoke respectfully but firmly. "I did not say you gave such an order in so many words. The complaint is that you instructed the Servicemen of the laboratory wing to refuse Natlane materials he requires for his research, which, of course, has the same result."

Nostrils threaded by fine capillaries pinched, barely perceptibly. "Is that what Natlane reported?"

"Natlane made no report. The matter was brought before us, last night, by another member."

"But Lampman Natlane verified it?"

Olejensen glanced sidewise at a startled grunt from Paulkruger, looked back to Van Gooch. "No. He was not present at the meeting, nor have we been able to locate him since."

"Indeed?" The ancient's deep-

socketed pupils narrowed to pinpoints. "Am I to take it that you have come to me with a complaint based entirely on hearsay?"

"We have two witnesses to the incident, sir. Current Technician Ganehru and Lampman Hailassie."

"Witnesses to a complaint that has not been made properly? My dear young man! Surely you know your jurisprudence better than that." The chief of staff smiled frostily. "No. I am afraid that I shall have to insist on your presenting a statement from the allegedly aggrieved worker before I can discuss the matter."

Olejensen flushed. "But—"

He was checked by Van Gooch's raised hand. "Before I can discuss it with you formally," the latter's low and strangely sweet voice went on. "Off the record, however, I want you to have the real facts." His fingers went to the whorled end of a chairarm, the tip of its forefinger flattened with pressure. "Anteroom. At about two-thirty p. m. yesterday I dictated a memo to the director of the laboratory wing. Play back the record of this memo."

"Play back memo to Director, laboratory wing, approx two-thirty p. m. yesterday." The disembodied accents were definitely feminine. "One moment, please."

The familiar whirr of a file-finder came into the room, then sundry s c r a t c h i n g s, and Van Gooch's own voice, unmistakable. "From Chief of Staff, Peace Dome. To Director, Laboratory Wing Recreation House.

"Message begins: Lampman Natlane, Chicago Lamp, Shift Three, having agreed at my suggestion to discontinue the research project on which he has been engaged, his orders for supplies therefore are hereby voided. Previous charges against Lampman Natlane's credits are to be transferred to my personal account. Rudolf van Gooch, Chief of Staff. Message ends."

The old man's finger lifted and the phono cut off. "When you have lived to my age, gentlemen," he murmured, "you will have ceased to be amazed by the distortions and misapprehensions human fallacy can impose even on such simple statements as that one."

Niyakama's breath hissed. The Capetowner's black brows knit and beneath them a dark light brooded. Olejensen's feet shuffled, embarrassedly. "Our apologies, sir. We should not have gone off half—"

"One moment," Paulkruger broke in. "I want to know something." His shoulders hulked and a growl underlay his words. "Natlane's been at that project of his six years and the charges against him must be enormous. Would you mind explaining, Chief van Gooch, your generosity in assuming them?"

The old man's lips tightened. "I do. I see no reason for any further explanation than stated in the memo." He was very small, very still, in his big chair. "Are you challenging its authenticity?"

"I'm not challenging anything.

I'm just telling you to remember that I and every other psychoneer intend to maintain our right to do exactly as we please in our own time, by whatever subterfuge you attempt to encroach on it."

"Paul!" Olejensen was distressed. "Good Lord, Paul. The chief hasn't said anything to warrant that outburst."

"No." Paulkruger rounded on him. "No. Not to us. But I'd like to know exactly what he said to Natlane yesterday. Everything's too pat. That memo. Natlane's vanishing from his usual haunts. And—Wait! How about that ass from Irkutsk with his tomfool blather about culture? Come to think of it, didn't we see him in that gyrcar that was leaving here as we arrived?"

He wheeled back to Van Gooch. "We did, didn't we? He was in here, confabbing with you."

If he'd expected the chief to be taken aback by the interrogation, he was disappointed. "Ivan Plovitch," the latter said smoothly, "if that is to whom you refer, was here for some time this morning endeavoring to persuade me to issue a general order establishing a Division of Culture, with himself at its head, which should have complete authority over the leisure-hour occupations of all the Dome's workers."

"You haven't the right!"

"So I told Commissar Plovitch. And I told him that even if I had, I should not think of issuing so senseless an order." The rustle that came from the ancient throat might be intended as a laugh. "Plovitch fairly danced with frustration. He informed me that he intends to go over my head and appeal to the Board, at its conclave tomorrow. I don't think, gentlemen, you need worry about the result. No matter how convincing the man may be, the Board will never take action against my opposition. But about Lampman Natlane. You may inform him that if he changes his mind and wishes to continue his research, he will be afforded every opportunity to do so."

"Is that official?" Paulkruger demanded.

"If you wish, I shall dictate a memo to that effect."

"It would be appreciated, sir," Olejensen said. "We ought to have something to bring back to our members."

"Quite." Rudolf van Gooch signaled to the anteroom. "Take a memo. From Chief of Staff, Peace Dome. To Director Laboratory Wing, Recreation House. Message begins: All previous memos concerning Lampman Natlane, Chicago Lamp, Shift Three, are hereby revoked. All Lampman Natlane's orders for supplies are to be honored . . ."

As their gyrcar zoomed away from the inverted turret, Olejensen turned to Paulkruger. "You were pretty rough for a few minutes there, Paul."

"It worked, didn't it? I made him back down and fast, didn't I?"

"We-l-l-l . . ."

"So sorry, brother secretary,"

Niyakima murmured, "but cannot agree you made honorable chief back down."

"The devil you say! I suppose I just dreamed I heard him dictate an order that Natlane's to have anything he wants."

The Kobean seemed much amused, in a toothy way, by this. "Why should not honorable chief dictate order? No harm, since Natlane not present to avail himself of it."

"Natlane's not the only one. Jocarter and Stanrod are missing, too."

"You don't say!" said Olejensen. "I knew they went to Nyork, but—aren't they back yet?"

"No," said Niyakima. "Remarkable coincidence, particularly since these three Lampmen were such very good friends."

"That's the payoff," Paulkruger growled. "Just what *is* going on around here? Who's pulling all this nonsense? There's something about Van Gooch's actions that smells. But what in time is the old mummy after?"

"Hold on," said Olejensen. "I'll admit that there seems to be a lot of dirty work around. But it *can't* be the chief! Why, the old fellow has an unimpeachable record. He has always stood up for us and for the democratic way."

"Premise granted. Record in favor of honorable chief. But if chief not guilty, who else?" Niyakima smiled again, arching his thin brows. "Who else has power to disappear a man? Who else would want to?"

"You have an interestingly devious mind," grunted Paulkruger, looking objectively at the Kobean.

"Is possible. Is the way I myself would handle situation."

"But why? Why?"

"Brother Natlane engaged on certain research. Possibly honored chief feels this research endangers world. Or—chief's position. Who would know mostly concerning research of Brother Natlane?"

"Why—Stanrod, I suppose. And Jocarter."

"Who are both missing." The black eyes gazed upward, then closed. "Most highly convenient," said Niyakama softly.

Olejensen didn't like it. "You are talking nonsense," he averred. "Chief van Gooch would never behave in the way you suggest. Granting for the sake of argument that so upright, almost noble, a person could bring himself to it, he would be crazy to take a chance on being accused of abduction when Natlane shows up."

"When Natlane shows up," the Kobean smiled, "we shall find abduction so cleverly managed impossible trace it to honorable chief of staff."

"*If* Natlane shows up," Paulkruger corrected, forebodingly.

TO BE CONCLUDED.

The Last Objective

by PAUL CARTER

The only way to avoid atomic bombs is to be where they ain't—and for an army, that meant tunneling underground in a really all-out way!

For uncounted eons the great beds of shale and limestone had known the stillness and the darkness of eternity. Now they trembled and shuddered to the passage of an invader; stirred and vibrated in sleepy protest at a disturbance not of Nature's making.

Tearing through the masses of soft rock, its great duralloy cutters screaming a hymn of hate into the crumbling crust, its caterpillar treads clanking and grinding over gravel shards fresh-torn from their age-old strata, lurched a juggernaut —one of the underground cruisers

of the Combined Western Powers. It was squat, ugly; the top of its great cutting head full forty feet above the clattering treads, its square stern rocking and swaying one hundred and fifty feet behind the diamond-hard prow. It was angular, windowless; there were ugly lumps just behind the shrieking blades which concealed its powerful armament.

It had been built for warfare in an age when the sea and air were ruled by insensate rocket projectiles which flashed through the skies to spend their atomic wrath upon objectives which had long since ceased to exist; where infantry no longer was Queen of Battles, since the ravages of combat had wiped out the armies which began the war. And floods of hard radiation, sterilizing whole populations and making hideous mutational horrors of many of those who were born alive, had prevented the conscription of fresh armies which might have won the war.

The conflict had been going on for more than a generation. The causes had long been forgotten; the embattled nations, burrowing into the earth, knew only a fiery longing for revenge. The chaos produced by the first aerial attacks had enabled the survivors to hide themselves beyond the reach even of atomic bombs to carry on the struggle. Navies and armored divisions exchanged knowledge; strategy and tactics underwent drastic revamping. Psychology, once the major hope of mankind for a solution to the war problem, now had become perverted to the ends of the militarists, as a substitute for patriotism to motivate the men at war. In new ways but with the old philosophies, the war went on; and therefore this armored monster clawed its way through the earth's crust toward its objective.

On the "bridge" of the underground warship, a small turret in the center of its roof, Commander Sanderson clung to a stanchion as he barked orders to his staff through the intercom. The ship proper was swung on special mountings and gyro-stabilized to divorce it from the violent jolting of the lower unit, consisting of the drill, the treads, and the mighty, earth-moving atomic engines. But still some of the lurching and jouncing of the treads was transmitted up through the store rooms through the crew's quarters to the bridge, and the steel deck underfoot swayed and shook drunkenly. However, men had once learned to accustom themselves to the fitful motions of the sea; and the hardened skipper paid no attention to the way his command pounded forward.

Commander Sanderson was a thickset man, whose hunched shoulders and bull neck suggested the prize ring. But he moved like a cat, even here inside this vibrating juggernaut, as he slipped from one command post to another, reading over the shoulders of unheeding operators the findings of their instruments. The Seismo Log was an open book to his practiced eye; his black brows met in a deep

frown as he noticed a severe shock registered only two minutes previously, only a few hundred yards to starboard. He passed by the radio locator and the radioman; their jobs would come later, meantime radio silence was enforced on both sides. The thin little soundman adjusted his earphones as the "Old Man" came by: "No other diggers contacted, sir," he muttered automatically and continued listening. The optical technician leaped to his feet and saluted smartly as the commander passed; he would have nothing to do unless they broke into a cavern, and so he rendered the military courtesy his fellows could not.

Sanderson halted beside the post of the environmental technician. This man's loosely described rating covered many fields; he was at once geologist, radarman, vibration expert, and navigator. It was his duty to deduce the nature of their surroundings and suggest a course to follow.

"Your report," demanded Sanderson.

"Igneous rock across our course at fifteen thousand feet, I believe, sir," he replied promptly. "It's not on the chart, sir—probably a new formation."

Sanderson swore. This meant volcanic activity — and whether man-made or accidental, that spelled trouble. "Course?" he asked.

"Change course to one hundred seventy-five degrees — and half speed, sir, if you please, until I can chart this formation more accurately."

Sanderson returned his salute, turned on his heel. "Mr. Culver!"

The young lieutenant commander saluted casually. "Sir?"

Sanderson repressed another oath. He did not like the young executive officer with his lordly manners, his natty uniform and the coat of tan he had acquired from frequent ultraviolet exposure—a luxury beyond the means of most of the pasty-faced undermen. But, duty is duty—"Change course to one seven five. Half speed," he ordered.

"Aye, aye, sir." Culver picked up a microphone, jabbed a phone jack into the proper plug, and pressed the buzzer.

Far below, near the clanking treads, Lieutenant Watson wiped the sweat from his brow—most of the ship was not as well insulated as the bridge, whose personnel must be at their physical peak at all times. He jumped as the intercom buzzed, then spoke into his chest microphone. "Navigation," he called.

"Bridge," came Culver's voice. "Change course to one seven five. Over."

"Navigation to bridge. Course. one seven five, aye, aye," said Watson mechanically. Then: "What is it, Culver?"

"Environmental thinks it's lava."

"Damnation." The old lieutenant —one of the few able-bodied survivors of the surface stages of the war—turned to his aides.

"Change course to one seven five."

Peterson, brawny Navigator Third Class, stepped up to a chrome handle projecting from a circular slot and shoved it to "175," then turned a small crank for finer adjustment. Slowly the pitch of the great blades shifted—the sound of their turning, muffled by layers of armor, abruptly changed in tone.

Chief Navigator Schmidt looked up from a pile of strata charts. "Ask the exec to have a copy of the new formation sent down here," he said, speaking as calmly as if he were a laboratory technician requesting a routine report. Schmidt was the psycho officer's pride and joy; he was the only person aboard the underground cruiser who had never been subjected to a mental manhandling as a result of that worthy's suspicions. He was slightly plump, pink-cheeked, with a straggling yellow mustache—just a little childish; perhaps that was why he had never cracked.

His request was transmitted; up on the bridge, the environmental technician threw a switch, cutting a remote repeater into the series of scanners which brought him his information. Chief Navigator Schmidt heard the bell clang, fed a sheet of paper into the transcriber, and sat back happily to watch the results.

The great drillhead completed its grinding turn; the blades tore into the rock ahead of it again.

"Navigation to bridge: bearing one seven five," reported Watson.

"Carry on," returned young Culver. He pulled out the phone jack, plugged it in elsewhere.

Ensign Clark stroked the slight, fuzzy black beard which was one of many ego-boosters for his crushing introversion, along with the tattoos on his arms and the book of physical exercises which he practiced whenever he thought he was alone. At Culver's buzz, he cursed the exec vigorously, then opened the circuit. "Power," he replied diffidently.

"Bridge to power: reduce speed by one half. Over."

"Power to bridge: speed, one half—aye, aye." Clark put his hand over the mike, shouted at the nonrated man stationed at the speed lever. "You! Half speed, and shake the lead out of your pants!"

The clanking of the treads slowed; simultaneously the whine of the blades rose, cutting more rapidly to compensate for the decreased pressure from behind the drill.

In the hot, steam-filled galley, fat Chief Cook Kelly lifted the lid from a kettle to sniff the synthetic stew. "What stinkin' slum—an' to think they kicked about the chow back in the Surface Wars."

"Chief, they say there was *real meat* in the chow then," rejoined Marconi, Food Chemist First Class.

"Why, Marc, even I can remember—" he was interrupted by the intercom's buzz.

"Attention all hands!" came Cul-

ver's voice. "Igneous rock detected, probably a fresh lava flow. We have changed our course. Action is expected within a few hours—stand by to go to quarters. Repeating—"

Kelly spat expertly. His face was impassive, but his hand trembled as he replaced the lid on the kettle. "We better hurry this chow up, Marc. Heaven only knows when we'll eat again."

Lieutenant Carpenter raised his hand, slapped the hysterical Private Worth twice.

"Now shut up or I'll have the psych corpsmen go over you again," he snapped.

Worth dropped his head between his hands, said nothing.

Carpenter backed out of the cell. "I'm posting a guard here," he warned. "One peep out of you and the boys will finish what they started."

He slammed the door for emphasis.

"Well, sir, you did it again," said the sentry admiringly. "He was throwing things when you got here, but you tamed him in a hurry."

"We've got to get these cells soundproofed," muttered Carpenter abstractedly, putting on his glasses. "The combat detachment bunks are right next to them."

"Yeah, sir, I guess it's harder on the combat detachment than the rest of us. We've all got our watches and so forth, but they haven't got a thing to do until we hit an enemy city or something. They crack easy—like this Worth guy in here now."

Carpenter whirled on him. "Listen, corpsman, I'm too busy a man to be chasing up here to deal with every enlisted man in this brig—I've got the other officers to keep in line. And let's not be volunteering information to superiors without permission!" he hissed.

"I'm sorry, sir—" the guard began—but the lieutenant was gone!

The sentry smiled crookedly. "O. K., Mr. Carpenter, your big job is to keep the officers in line. I'm just wonderin' who's supposed to keep *you* out of this cell block."

Corporal Sheehan dealt the cards with sudden, jerky motions; his brow was furrowed, his face a study in concentration. One would have thought him a schoolboy puzzling over a difficult final examination.

Sergeants Fontaine and Richards snatched each card as it came, partly crushing the pasteboards as they completed their hands. Fat old Koch, Private First Class, waited until all the cards had been dealt, then grabbed the whole hand and clutched it against his broad stomach, glancing suspiciously at his fellow players.

Their conversation was in terse, jerky monosyllables—but around them other men of the combat detachment talked, loudly and incessantly. Private Carson sat in a corner, chain smoking in brief, nervous puffs. Coarse jokes and

harsh laughter dominated the conversation. Nobody mentioned Culver's "alert" of a few minutes before.

"Three," grunted the obese Koch. Sheehan dealt him the cards swiftly.

"Hey!" Richards interrupted, before play could begin. "I didn't like that deal. Let's have a look at that hand."

"Know what you're callin' me?" retorted Sheehan, snatching the

deck as Richards was about to pick it up.

"Yeah—I know what to call you, you lyin', yella cheat—"

Sheehan lurched to his feet, lashed out with a hamlike fist. Richards scrambled out of the way, bringing chair and table down with a crash. A moment later both men were on their feet and squared off.

Conversation halted; men drifted over toward the table even as Fontaine stepped between the two players. Koch had not yet fully reacted to the situation and was only halfway out of his chair.

"You fools!" shouted Fontaine. "You want the psych corpsmen on our necks again? That louse Carpenter said if there was another fight we'd all get it."

Corporal Sheehan's big fists unclenched slowly. "That low, stinkin'—"

"Sit down," said Koch heavily. "Fontaine's right. The psychs probably have a spy or two planted in this room." His eye rested briefly on Carson, still smoking silently alone in the corner, seemingly oblivious of the commotion.

"That Carson," muttered Richards, shifting the object of his anger. "I'll bet any money you want he's a stool for Carpenter."

"Always by himself," corroborated Sheehan. "What's the story about him—born in a lab somewhere, wasn't he?"

The others were moving away now that it was plain there was to be no fight. Koch picked up the cards, stacked them. "Carson may not even be human," he suggested. "The science profs have been workin' on artificial cannon fodder for years, and you can be sure if they ever do make a robot they're not goin' to talk about it until it's been tried in combat."

Carson overheard part of his statement; smiled shortly. He rose and left the room.

"See?" Richards went on. "Probably puttin' all four of us on report right now."

Lieutenant Carpenter placed the wire recorder back inside its concealed niche, polished his glasses carefully, opened his notebook, and made several entries in a neat schoolteacher's hand:

Friction betw. Sheehan, Richards worse —psych. reg. next time back to Gen. Psych. Hosp. New Chicago. No sign men susp. Koch my agent; K. planting idea of robots in crews' minds per order. Can reveal Carson whenever enemy knows Powers mfg. robots in quantity. Fontaine well integrated, stopped fight—recomm. transfer my staff to Sanderson.

He put the notebook away, began to climb the nearest metal ladder with the mincing, catlike tread which the whole crew had learned to hate.

The lone guard before the massive lead-and-steel door of the central chamber saluted as the lieutenant passed. His task was to safeguard the ship's most important cargo—its sole atomic bomb. Carpenter asked him several routine word-association questions before proceeding.

The lieutenant paused just once

more in his progress upward. This was to play back the tape of another listening device, this one piped into the quarters of the men who serviced the mighty atomic engines. Making notes copiously, he proceeded directly to the bridge.

"Captain, my report," he announced, not without some show of pride.

"Later," said Sanderson shortly, without looking up from a rough strata chart the environmental technician had just handed him.

"But it's rather important, sir. Serious trouble is indicated in the combat detachment—"

"It always is," retorted Sanderson in some heat. "Take your report to Culver; I'm busy."

Carpenter froze, then turned to the young lieutenant commander. "If you will initial this, please—"

Culver repressed a shudder. He couldn't keep back the rebellious feeling that the ancient navies had been better off with their primitive chaplains than the modern underground fleets with their prying psychiatrists. Of course, he hastily told himself, that was impossible today—organized religion had long since ceased to sanction war and had been appropriately dealt with by the government.

The Seismo Log recorded a prolonged disturbance directly ahead, and as Sanderson began his rounds the environmental technician called to him. "Sudden fault and more igneous activity dead ahead, sir," he reported.

"Carry on," replied Sanderson. "Probably artificial," he muttered half to himself. "Lot of volcanism in enemy territory . . . Mr. Culver!"

Culver hastily initialed the psycho officer's notebook and handed it back. "Sir?"

"Elevate the cutters twenty-five degrees—we're going up and come on the enemy from above."

The order was soon transmitted to navigation; Lieutenant Watson's efficient gang soon had the metallic behemoth inclined at an angle of twenty-five degrees and rising rapidly toward the surface. Chief Schmidt dragged out new charts, noted down outstanding information and relayed data topside.

The ship's body swung on its mountings as the treads assumed the new slant, preserving equilibrium throughout. An order from Ensign Clark of power soon had the ship driving ahead as fast as the cutters could tear through the living rock.

"Diggers ahead," the thin soundman called out suddenly, adjusting his earphones. He snapped a switch; lights flickered on a phosphorescent screen. "Sounds like about three, sir—one is going to intersect our course at a distance of about five thousand yards."

"Let him," grunted Sanderson. "Mr. Culver, you may level off now."

"Electronic activity dead ahead," and "Enemy transmitter dead ahead," the radio locator and radioman reported almost simultaneously, before Culver's quiet order had been carried out.

"Go to general quarters, Mr. Cul-

ver," ordered Sanderson quickly. The exec pressed a button.

Throughout the ship was heard the tolling of a great bell—slowly the strokes lost their ponderous beat, quickened in tempo faster and faster until they became a continuous pandemonium of noise; simultaneously the pitch increased. All of this was a trick devised by staff psych officers, believing it would produce a subconscious incentive to greater speed and urgency.

The observational and operational posts were already manned; now, as quickly as possible, reliefs took over the more grueling watches such as that of the environmental technician. Medical and psych corpsmen hurriedly unpacked their gear, fanned out through the ship. Ensign Clark's voice faltered briefly as he ordered the power consumption cut to a minimum. The great cruiser slowed to a crawl.

The galley was bedlam as Kelly and Marconi rushed from one kettle to the next, supervising the ladling of hot food into deep pans by the apprentices who had assembled in haste in response to Kelly's profane bellowing. Chow runners dashed madly out the door, slopping over the contents of the steaming dishes as they ran. "Battle breakfast" was on its way to the men; and even as the last load departed, Kelly shut off all power into the galley and shrugged his squat form into a heavy coverall. Marconi snatched two empty trays, filled them, and the two men wolfed their meal quickly and then ran at full tilt down toward the combat detachment's briefing room.

Here the scene was even more chaotic. Men helped one another hastily into coveralls, rubber-and-steel suits, metallic boots. They twisted each other's transparent helmets into place, buckled on oxygen tanks, kits of emergency rations, first-aid equipment, and great nightmarish-looking weapons. Richards and Sheehan, their quarrel temporarily forgotten, wrestled with the latter's oxygen valve. Koch struggled mightily with the metal joints of his attack suit, Fontaine checked the readings of the dials on a long, tubular "heat ray" machine. Carson, fully outfitted, manipulated the ingenious device which brought a cigarette to his lips and lit it. He took a few puffs, pressed another lever to eject the butt, and wrenched his helmet into place with gloved hands. From now until the battle was over, the men would carry all their air on their backs, compressed in cylinders. Underneath the shouts and the rattling noises of the armor could be heard the screams of Private Worth from his cell next door. They were suddenly cut off; one of Lieutenant Carpenter's watchful corpsmen had silenced the boy.

And now there was nothing to do but wait. The combat detachment's confusion subsided; but a subdued clatter of shifting armor, helmets being adjusted, tightening of joints, the rattle of equipment, and telephoned conversation continued. The new bridge watch checked their instruments, then settled down to careful, strained waiting. Sanderson

paced his rounds, hearing reports and issuing occasional orders. Culver stood by the intercom, told the crew all their superiors knew of the opposition as the information came in. Carpenter cat-footed through the ship, followed at a discreet distance by four of his strong-arm men.

Ensign Clark was white with fear. He sat stiffly at his post like a prisoner in death row; the sweat rolled down his face and into his soft black beard. He tried to repeat the autosuggestion formulae Carpenter had prescribed for him, but all that he could choke out was a series of earnest curses which a kinder age would have called prayers.

He jumped as if he had been shot at Culver's sudden announcement: "Attention all hands. Enemy digger believed to have sighted this ship. Prepare for action at close quarters." The voice paused, and then added: "Bridge to power: full speed ahead for the next half hour, then bring the ship to a halt. We'll let the enemy carry the fight to us."

Clark automatically repeated, "Full speed ahead—" then cringed as the crewman slammed the lever over and the cruiser leaped forward with a shrill whine of its blades. "No!" he suddenly yelled, leaping out of his seat. "Not another inch, —stop this ship!" He ran over to the speed lever, pushed at the crewman's hands. "I won't be killed, I won't, I *won't!*" The brawny crewman and the maddened officer wrestled desperately for a moment, then the crewman flung his superior on his back and stood over him, panting. "I'm sorry, sir—"

Clark lay there whimpering for a few seconds, then made a quick grab inside his shirt and leveled a pistol at the towering crewman. "Get over there," he half-sobbed, "and stop this ship before I shoot you."

The white-uniformed psych corpsman flung open the door and fired, all in one motion. The crewman instinctively backed away as the little pellet exploded, shredding most of Clark's head into his cherished beard, the crewman stood over the body, making little wordless sounds.

"Go off watch," ordered Carpenter, coming into the room on the heels of his henchman. "Get a sedative from the medics." He gazed lingeringly, almost appreciatively, on the disfigured face of the dead man before covering it with the ensign's coat. Then he called Culver and told him briefly what had happened.

"I'll send a relief," promised the exec. "Tell him to reduce speed in another twenty minutes. That was quick thinking, Carpenter; the captain says you rate a citation." The psycho officer had failed to give the corpsman credit for firing the shot.

Sanderson caught Culver's eye, put a finger to his lips.

"Huh?" Culver paused, then got the idea. "Oh—and, say, Carpenter—don't let the crew hear of this. It wouldn't do for them to know an officer was the first to crack." There was a very faint trace of sarcasm in his tone.

But Sanderson's warning was already too late. The power crewman who had witnessed Clark's

death agonies talked before he was put to sleep; the medic who administered the sedative took it to the crew. By the time Carpenter had received the new order from Culver, his efficient corpsmen had disposed of Clark's body and the whole ship knew the story. It hit the combat detachment like a physical blow; their strained morale took a serious beating, and the officers grew alarmed.

"Pass the word to let them smoke," Sanderson finally ordered, after the great ship had shuddered to a halt and backed a short distance up the tunnel on his order. "Give them ten minutes—the enemy will take at least twice that to get here. Have Carpenter go down and administer drugs at his own discretion—maybe it will slow them for fighting, but if they crack they'll be of no use anyway."

And so for ten minutes the combat crewmen removed their helmets and relaxed, while the psychos moved unobtrusively throughout the room, asking questions here and there, occasionally giving drugs. Once they helped a man partially out of his armor for a hypo. Tension relaxed somewhat; the psych corpsmen could soothe as well as coerce.

Kelly and Marconi were engaged in a heated argument over the relative merits of synthetic and natural foods—a time-tested emotional release the two veterans used habitually. Koch was up to his ears in a more serious controversy—for Sheehan and Richards were practically at each other's throats again. Carson as usual said nothing, smoked continuously; even the level-headed Fontaine got up and paced the floor, his armor clanking as he walked. Three men had to be put to sleep. Then the ten-minute break was over and the strain grew even worse.

Carpenter spoke softly into the intercom. "Tell the commander that if battle is not joined in another hour I cannot prevent a mutiny. Culver, I *told* you not to leave that man on watch—if you had listened to me Ensign Clark need not have been liquidated."

Culver's lip curled; he opened his mouth to reply in his usual irritating manner—but at that moment the soundman flung the earphones off his head. The roar of shearing duralloy blades was audible several feet away as the phones bounced to the deck. "Enemy digger within one hundred feet and coming in fast!" the soundman shouted.

"Don't reverse engines!" Sanderson roared as Culver contacted the new power officer. "Turn on our drill, leaving the treads stationary—we'll call his bluff."

Culver issued the necessary order, then alerted the crew again. The great blades began to whirl once more; there was a brief shower of rocks, and they churned emptiness—their usual throbbing, tearing chant became a hair-raising shriek; the blast of air they raised kicked up a cloud of dust which blanketed the fresh-carved tunnel—"That's for their optical technician," explained Sanderson. "He'll be blind when he comes out—and we've a sharp gunnery officer down in fire control that will catch them by surprise."

The soundman gingerly picked up the headphones; the roar of the enemy's drill had dropped to a whisper — Sanderson's curious tactics evidently had him guessing, for he had slowed down—

The sound of the approaching drill was now audible without the benefit of electronic gear, as a muffled noise like the chewing of a great rat. Then came the chattering break-through, and Sanderson knew he had contacted the enemy, despite the dust clouds which baffled even the infrared visual equipment.

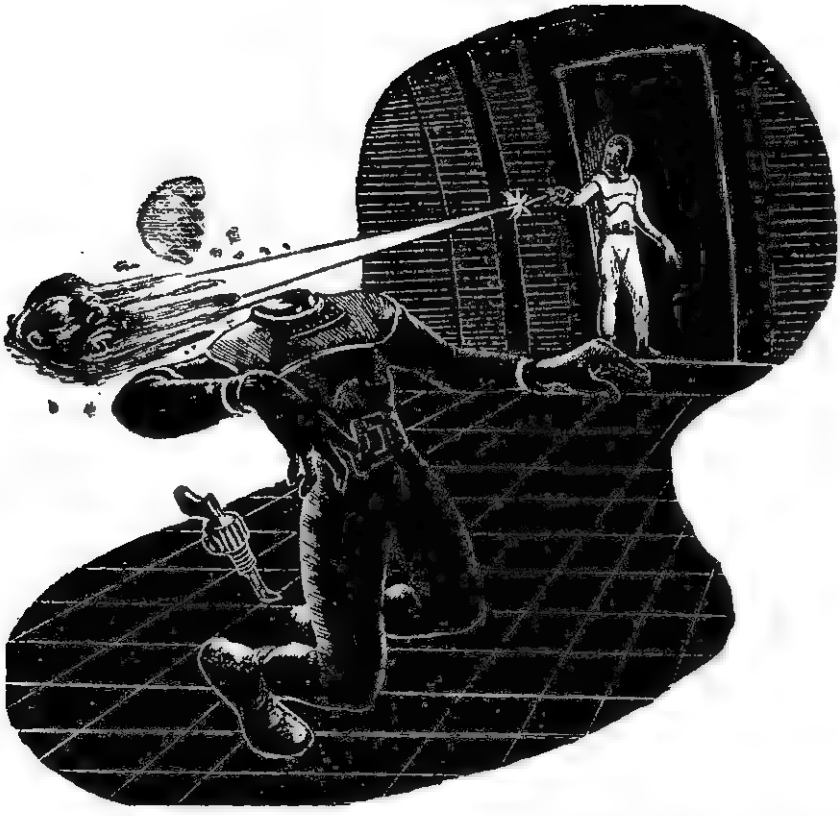
Temporarily blind, confused by the whirling blades of their motionless opponent, the enemy hesitated for the precious seconds that meant the difference between victory and destruction.

As the enemy warhead broke through, the cruiser's whirling blades suddenly came to a quivering halt. Simultaneously the forward batteries opened fire.

Gone were the days of laboring, sweating gun crews and ammunition loaders. All the stubby barrels were controlled from a small, semicircular control panel like an organ console. Lieutenant Atkins, a cool, competent, graying officer who had once been an instructor at the military academy, calmly pressed buttons and pulled levers and interestedly watched the results by means of various types of mechanical "eyes." And so it was that when the sweep second hand of his chronometer crossed the red line, Atkins' sensitive fingers danced over the keys and the ship rocked to the salvos of half its guns.

Magnified and echoed in the narrow tunnel, the crash of the barrage rolled and reverberated and shouted in an uninterrupted tornado of pure noise, roar upon roar—the light of the explosions was by contrast insignificant, a vicious reddish flare quickly snuffed in the dust. The ship jerked with each salvo; faint flashes and Olympian thunders tossed the great cruiser like a raft on the wild Atlantic. The fury of sound beat through the thick armor plate, poured and pounded savagely past the vaunted "Soundproof" insulation. The decks lurched and reeled underfoot; instruments and equipment trembled with bone-shaking vibrations. Crash upon thunderous crash filled the air with new strains of this artillery symphony; and then Culver pressed a button. His voice could not be heard through the racket, but the sudden glow of a red light in the combat detachment's assembly room transmitted his order instantly—"Away landing party!"

And then the trap between the great, flat treads was sprung, and the mechanical monster spawned progeny, visible only by infrared light in the underground gloom—little doll-like figures in bulky, nightmarish costumes, dropping from a chain ladder to the broken shale underfoot, running and stumbling through the debris, falling and picking themselves up and falling again like so many children—Marconi and Kelly and Carson and Sheehan and Richards and Fontaine and Koch, tripping over the debris and frag-



ments which the great machine had made.

And at last the enemy cruiser replied, even as the landing party picked its way through the obscuring dust and fanned out from its source. Though confused and blind, the men of the other ship, too, had been prepared for action, and thus new sounds were added to the din that were not of the attackers' making.

A titanic explosion rocked the carriage of Sanderson's cruiser; then another, and still another, strewing steel fragments indiscriminately among the men in the tunnel. The ferocity of the defense was less than the attack; much of their armament must have been destroyed on the first salvo—but what remained wrought havoc. Some quick-witted commander of the enemy must have anticipated the landing of a ground party for fragmentation shells burst near the embattled cruisers, and here and there the armored figures began to twist and jerk and go down. Their comrades dropped into the partial protection of the broken rock and continued their advance.

Fontaine ran and crawled and

scrambled and crouched over the tunnel floor, which was visible to his infrared-sensitive helmet, and torn now even more by arrowing slivers of steel. His hand found a valve, twisted it to give him more oxygen for this most critical part of the struggle. He did not think much; he was too busy keeping alive. But a bitter thought flashed across his mind—*This part of war hasn't changed a bit.* He leaped over a strange and terrible object in which armor, blood, rock, and flesh made a fantastic jigsaw puzzle which had lost its meaning. Once again he merely noted the item in his subconscious mind; he did not think.

Lieutenant Atkins' fingers still danced over the console; his face was exalted like that of a man playing a concerto. And into the symphony of death which he wove with subtle skill there crept fewer and fewer of the discords of the enemy's guns.

Sanderson paced the deck moodily, communicating briefly with his subordinates by means of lip reading which Culver swiftly translated into many-colored lights. Information came back to the bridge in the same manner. Sanderson smiled with grim satisfaction at the scarcity of dark lamps on the master damage control board. Those mighty walls could take a lot of punishment, and damage so far had been superficial—one blast in the psycho ward; Private Worth would suffer Carpenter's displeasure no longer.

The helmeted monstrosities grew bolder in their advance as the counter-barrage slackened. Now there was but one battery in action, far to the left—all the thunder came from their own ship.

Fontaine rose from the little depression in which he had been crouching. Another man waved to him; from that outsized suit it would have to be Koch. The big man's armor was dented, the rubber portions torn—his steel right boot looked like a large, wrinkled sheet of tinfoil, and he dragged the leg behind him. But he saw Fontaine, pointed a gauntleted finger into the gloom. The enemy ship must be up there; yes, there was the flash of the one operating gun — Fontaine moved forward.

There was another, nearer flash; something exploded on Koch's chestplate, knocking him down. He moved, feebly, like a crushed insect, then lay still. Fontaine immediately slipped back into his hollow; for here was the enemy.

A man in a light, jointed metal suit of Asian make appeared from behind a boulder, slipped over to Koch's body to examine it, felt for Koch's weapons.

Fontaine unslung the long, bazookalike heat ray tube—an adaptation of very slow atomic disintegration—and pressed the firing stud. The weapon contributed no noise and no flare to the hellish inferno of the tunnel, but the Asiatic suddenly straightened up, took a step forward. That was all he had time for.

Accident and his jointed armor combined to keep his body standing. Fontaine made sure of his man by holding the heat ray on him until the enemy's armor glowed cherry-

red, then released the stud. He came forward, gave the still-glowing figure a push. The body collapsed with a clatter across Koch. Fontaine pushed on—the dust was at last clearing slightly, and directly ahead loomed the enemy ship.

Another Asiatic appeared over a short ridge; too quick for the heat ray. Fontaine drew his pistol and fired. The pellet flared; another enemy went down.

Something whizzed over Fontaine's head; he ducked, ran for cover. Somebody was firing high-speed metallic slugs from an old-fashioned machine gun, and his party-rubber suit would not stop them. Miraculously he found himself unharmed in front of the enemy ship.

Its drill was torn and crumpled, blades lying cast off amongst the rocks; one of the treads was fouled, and the forward part of the carriage was smashed in completely. This war vehicle would obviously never fight again—another volley of slugs chattered overhead, and Fontaine rolled back out of the way. *Snap judgment,* he told himself ironically in another rare flash of lucidity. *Maybe she'll never fight after this time, but she's got plenty of spirit right now.*

He dug a hole in the loose shale and tried to cover himself as much as possible, meanwhile surveying the layout. They couldn't know he was here, or his life would have been snuffed out; but he could neither advance nor retreat. He absently transmitted the prearranged "contact" signal back to the cruiser. Then he settled himself, soldier wise, to wait as long as might be necessary.

Fontaine's "contact," and several others, returned to their ship as lights on a board. The landing party could proceed no further or they would encounter their own barrage. Sanderson immediately gave the "cease fire" order. The barrage lifted.

Culver shouted down an immediate flood of radio reports that broke the sudden, aching silence. "Lieutenant Atkins, you will continue action against the remaining enemy battery until you have destroyed it, or until I inform you that members of the task force have neutralized it."

"Aye, aye, sir." Atkins turned back to his guns, studied the image of the battered enemy ship which was becoming increasingly visible as the dust settled. He restored all the automatic controls to manual, pressed several buttons judiciously, and fingered a firing switch.

To Fontaine, crouching in his retreat under the enemy ship, the sudden silence which followed the barrage was almost intolerable. One moment the guns had thundered and bellowed overhead; the next, there were a few echoes and reverberations and then all was over.

His ears sang for minutes; his addled brains slowly returned to a normal state. And he realized that the silence was not absolute. It was punctually broken by the crash of the remaining enemy battery, and soon at less frequent intervals by

the cautious probing of Atkins' turrets. And between the blows of this duel of giants he could at last hear the whine of metal slugs over his head.

This weapon had him stumped. The Asiatic explosive bullets, such as the one that had killed Koch, only operated at farily close quarters; the rubber suits were fairly good insulation against death rays; and the Asiatics had no heat ray. But with an antiquated machine gun an Asiatic could sit comfortably at a considerable distance from him and send a volley of missiles crunching through the flimsy Western armor to rip him apart in helpless pain. He raised his head very slightly and looked around. The detachment was well trained; he could see only three of his fellows and they were well concealed from the enemy. Under infrared light—the only possible means of vision in the gloom of the tunnel — they looked like weird red ghosts.

Something gleamed ahead of him. He sighted along the tubular barrel of the heat ray, energized its coils. The mechanism hummed softly; the Asiatic jumped out of his hiding place and right into the machine gun's line of fire. The singing bits of metal punched a neat line of holes across his armor and knocked him down, twisting as he fell. Moments later the chattering stream stopped flowing, and Fontaine dashed for more adequate cover. Bullets promptly kicked up dust in little spurts in the hollow he had just vacated.

He searched the darkness, a weird, shimmering ghostland revealed to him by its own tremendous heat through his infrared equipment. The ship and his armor were very well insulated; he had not been conscious of the stifling heat or the absolute night-gloom which would have made combat impossible for an unprepared, unprotected soldier of the Surface Wars.

Atkins' insistent batteries spoke; there was a great flash and a series of explosions at the enemy target to the left. Fontaine seized the opportunity to make a charge on the loosely-piled boulders which, his practiced eye told him, sheltered the deadly machine gun. He fell and rolled out of the line of fire as the opposing gunner found him and swerved his weapon; then began to fire explosive pellets at the crude nest, showering it with a series of sharp reports. The enemy machine gun swung back and forth, raking the terrain in search of the invader.

Fontaine unloaded his heat ray, placed it in a well-sheltered crevice and worked it around until it was aimed at the enemy, then shorted the coils. The weapon throbbed with power; rocks began to glow, and the flying slugs poured down upon the menacing heat ray, trying to silence it. Meanwhile Fontaine, like uncounted warriors of all ages, began cautiously to work his way around to the left for a flank attack. Indeed, there were many things in war that had not changed.

"Fire control to bridge: enemy battery silenced," Atkins reported firmly.

"Secure fire control," Culver ordered, then turned on his heel. "The enemy's ordnance is destroyed, sir," he asserted. "Our combat crewmen are engaging the enemy in front of his ship."

"Send Mr. Atkins my congratulations," Sanderson replied promptly. "Then inform the combat detachment of the situation."

Culver turned back to the intercom—then started, as a siren wailed somewhere in the bowels of the ship. A station amidships was buzzing frantically; he plugged in the mike. "Bridge," he answered.

"Atomic bomb watch to bridge: instruments show unprecedented activity of the bomb. Dangerous reaction predicted."

Culver fought to keep his voice down as he relayed the information. The bridge watch simply came to a dead stop; all eyes were on Sanderson.

Even the phlegmatic commander hesitated. Finally: "Prepare to abandon ship," he ordered, heavily.

At once the confusion which had accompanied the preparations of the combat detachment was repeated throughout the ship. Atomic bombs by this time were largely made of artificial isotopes and elements; the type which they carried had never been tested in combat—and radioactive elements can do strange and unpredictable things when stimulated. Mere concussion had started the trouble this time, and the mind of man was incapable of prophesying the results. The bomb might merely increase in the speed of its radioactive decay, flooding the ship and the bodies of its men with deadly gamma rays; it might release enormous heat and melt the cruiser into a bubbling pool of metal; it might blast both of the ships and a mile on cubic mile of rock out of existence—but all they could do was abandon the cruiser and hope for the best. All mankind was unable to do more.

Sanderson's forceful personality and Carpenter's prowling corpsmen prevented a panic. Men cursed as they struggled with obstinate clasps and joints. A few of Kelly's apprentices who had not gone into combat flung cases of concentrated food through the landing trap to the tunnel floor. Culver packed the ship's records—logs, papers, muster sheets, inventories—into an insulated metal can for preservation. A picked force of atomic technicians in cumbersome lead suits vanished into the shielded bomb chamber with the faint hope of suppressing the reaction.

Sanderson paused before sealing his helmet. "Mr. Culver, you will have all hands assemble in or near the landing trap. We must advance, destroy the enemy and take refuge in his ship; it is our only hope."

Navigation buzzed; Culver made the necessary connection. "One moment, sir," he murmured to Sanderson. "Bridge."

The young exec could visualize old Lieutenant Watson's strained expression, his set jaw. "Navigation requests permission to remain aboard when ship is abandoned," Watson said slowly. "Chances of crew's survival would be materially

increased if the ship reversed engines and departed this area—"

Sanderson was silent a long moment. "Permission granted," he finally answered in a low voice. He started to say more; caught Carpenter's eye and was silent.

But Culver could not maintain military formality in answering Watson's call. "Go ahead, Phil, and —thanks," he replied, almost in a whisper.

Carpenter stepped forward quickly. "This is no time for sentiment, Mr. Culver," he snapped. "Lieutenant Watson's behavior was a little naive for an officer, but the important fact remains that his antiquated altruism may be the means of preserving the lives of more important personnel." He waved a sheaf of loose papers excitedly. "This report of mine, for example, on the psychiatric aspects of this battle will be invaluable to the Board—"

Crack!

All the wiry power of the young exec's rigidly trained body went into the punch; literally traveled through him from toe to fist and exploded on the psycho officer's jaw. Months of harsh discipline — psychological manhandling—the strain of combat —repressed emotions, never really unhampered since his childhood—the sense of the war's futility which had not been completely trained out of anyone—his poorly-concealed hatred for Carpenter—all these subconscious impressions came boiling up and sped the blow—and his hand was incased in a metal glove.

Carpenter's head snapped back. His feet literally flew off the deck as his body described a long arc and slammed into the far wall. He sprawled there grotesquely like a discarded marionette. Miraculously his glasses were unbroken.

The iron reserve which Sanderson had kept throughout the battle left him with the disruption of his neat, disciplined little military cosmos. For a long time he was unable to speak or move.

Two tough-looking psych corpsmen closed in on the exec, who stood facing the fallen officer, his fists clenched. He twisted angrily as they grabbed his arms.

"Let him alone," Sanderson ordered, coming to his senses. They reluctantly released Culver.

"Mr. Culver," the skipper said very quietly, "I need you now. You will resume your duties until this crisis is over. But, if we come through this, I'm going to see that you're broken."

Culver faced him, anger draining out of him like the color from his flushed face. He saluted, turned back to the intercom to give out the last order Sanderson had issued. "Attention all hands," he called mechanically. "Fall in at the landing trap to abandon ship."

Sanderson beckoned to the two psych corpsmen. "Please take Lieutenant Carpenter to sick bay," he ordered. "Bring him around as soon as you can."

The Asiatic squatted crosslegged behind his shining pneumatic machine gun, frantically raking the rock-strewn ground before him. The

air ahead shimmered and danced with heat; the other side of his crude stone shelter must be glowing whitely, and the sweat ran down his yellow face even though the tiny cooling motor within his armor hummed savagely as it labored to keep him from suffocating. He must destroy the offending heat ray or abandon his position.

A confused impression of rubber-and-metal armor was all he received as Fontaine rushed upon him from the side. The two men came together and went down with a loud clatter of armor; rolled over and over in quick, bitter struggle. Even in the Atomic age there could be hand-to-hand combat.

It was an exhausting fight; the battle suits were heavy, and awkward. They wrestled clumsily, the clank of their armor lending an incongruously comic note. The lithe Asiatic broke a hold, cleared his right hand. Fontaine rolled over to avoid the glittering knife his opponent had succeeded in drawing. Here beneath the crust a rip in his rubberized suit would spell disaster. The Asiatic jumped at him to follow up his advantage. Fontaine dropped back on his elbows, swung his feet around and kicked viciously.

The metal boot shattered the Asiatic's glass face plate, nearly broke his neck from its impact. Shaken by the cruel blow to his face, blinded by blood drawn by the jagged glass, gasping from the foul air and the oppressive heat, he desperately broke away and ran staggeringly toward the right, misjudging the direction of his ship.

Fontaine estimated the number of explosive bullets he had left, then let his enemy go, knowing there would be no more danger from that quarter. He lay unmoving beside the abandoned machine gun, breathing heavily. His near-miraculous survival thus far deserved a few minutes' rest.

The enemy's landing trap, like the Western one, was under the ship's carriage; instead of a chain ladder, a ramp had been let down. A terrific melee now raged around the ramp—Fontaine and his opponent had been so intent on their duel they had not seen the tide of battle wash past them. Here and there lay dead men of both sides; his recent enemy had soon been overcome and lay not a score of feet away, moving spasmodically. Battle-hardened as he was, Fontaine seriously debated putting the fellow out of his misery—death from armor failure was the worst kind in this war except radioactive poisoning—then carefully counted his explosive pellets again. Only six—he might need them. He dismissed the writhing Asiatic from his mind.

He looked up at the smashed hull of the enemy ship, and an idea came to him. They wouldn't be watching here, with their ship in danger of being boarded elsewhere.

He rose, moved quietly to the great right-hand tread. The flat links here were torn and disconnected; he seized a loose projection and hauled himself upward. Slipping and scrambling, using gauntleted hands and booted feet, he reached the top of the tread.

Directly above him was a jagged hole in the ship's carriage, about four feet long. He seized the edges and somehow managed to wriggle his way inside.

The interior was a shambles of smashed compartments, with men and metal uncleanly mated. Fontaine laboriously pushed his way forward, climbing over and around barriers flung up at the caprice of Atkins' guns. Once he was forced to expend one of the precious pellets; the recoil nearly flattened him at such close quarters, but he picked himself up and climbed through the still-smoking hole into a passageway which was buckled somewhat but still intact.

He looked carefully in both directions, then saw a ladder and began to ascend. It brought him into a

small storage compartment which was still illuminated. He grunted in satisfaction; if he had reached the still-powered portion of the ship, he was going in the right direction.

He eased the door open three inches; air hissed—this compartment must be sealed off. He quickly passed through, closed the door, and cautiously tested the air—good; this part of the ship still had pure air and insulation. Confidently he continued forward and climbed another ladder toward the bridge.

He had to wait at one level until a sentry turned his back. Then he sprang, and his steel fingers sank into the Asiatic's throat. There was no outcry.

Faintly from below there came the sounds of a struggle; his comrades had successfully invaded the ship. Curiously, Fontaine tried his helmet radio. It had been put out of commission in his fight with the machine gunner outside.

There were no more sentries; that was odd. He proceeded with extreme caution as he came to the ladder leading up to the bridge. Here would be the brains of the Asiatic ship; his five remaining pellets could end the engagement now that the battle was raging on enemy territory.

He stumbled over something—a man's foot. He dragged the body out of the shadows which had concealed it.

"What the devil—"

The man had been another guard. His chest was shattered; an explosive pistol was clutched in his right hand. One pellet was missing from the chamber.

Wonderingly Fontaine climbed the ladder, halted at the door.

Lying at his feet was another sentry. The man's body was unmarked, but his face bore signs of a painful death. A small supersonic projector lay near him.

Fontaine opened the door—and turned away, sick.

Somebody had turned on a heat ray at close quarters. Officers and enlisted men lay in charred horror. And in the center of the room, the ship's commanding officer slumped on a bloodstained silken cushion. The man had committed honorable suicide with a replica of an ancient Japanese samurai sword.

In his left hand was a crumpled sheet of yellow paper, evidently a radiogram.

Fontaine took the scrap from the lax yellow fingers, puzzled over the Oriental characters.

Then he went outside, and closed the door, and sat down at the head of the ladder to await the coming of men who might be able to solve the mystery.

The last man scrambled down the swaying chains and dropped to the ground from the Western cruiser.

Lieutenants Watson and Atkins were alone in the ship.

"Why did you stay?" demanded Watson, throwing the starting switch. He had hastily rigged an extension from the power room to navigation. "Only one man is needed to operate the ship, in an emergency."

Lieutenant Atkins found a fine cigar in his uniform. "I've been saving this," he remarked, stripping off the cellophane wrapper lovingly. "The condemned man indulges in the traditional liberties."

"Answer my question," Watson insisted, advancing the speed lever.

Atkins pressed a glowing heating-coil "lighter" to the tip of the cigar. "Let me ask you this—why did *you* make this heroic gesture?"

Watson flushed. "You might as well ask—why fight at all?"

"You might," Atkins said, smiling slightly.

"I did this because our men come first!" Watson shouted almost in fury.

Atkins chuckled. "Forgive me, old friend—I find it hard to shake off the illusions I had back in the Last Surface War, myself." He blew a huge cloud of smoke. "But when Culver sent down the commander's congratulations to me for silencing that enemy battery, it struck me how empty all our battles and decorations are."

Watson shoved the speed lever to maximum; the cruiser rolled backward down the tunnel at a terrific velocity, no longer impeded by masses of rock. After a long silence he asked: "Atkins—what were *you* fighting for?"

Atkins looked him squarely in the eye. "Well, I managed to hypnotize myself into a superficial love of massed artillery—it's a perversion of my love for the symphony—used to conduct a small orchestra at the academy before it was dissolved and the funds allocated to a military band. I liked that orchestra; felt I was doing something constructive for once." He was silent for a while, smoking and reminiscing. Coming back to reality with a start, he went on hastily: "Of course underneath it all I guess I was motivated just the way you were—to maintain the dead traditions of the service, to save our shipmates who would have died anyway, and to advance a cause which no longer exists."

Watson buried his head in his hands. "I fought because I thought it was the right thing to do."

Atkins softened. "So did I, my friend," he admitted. "But it's all over now—"

He paused to flick ashes from the cigar. "I saved something else for this," he went on irrelevantly. "Carpenter is gone now, Watson, so we can dispense with his psychopathic mummery. What a joke if he should ever know I had this aboard." He laughed lightly, producing a small, gold-stamped book bound in black leather. "This sort of thing is the only value left, for us," he asserted. "Let us pray."

And thus, a few minutes later, the two elderly officers died. It was not a great blast, as atomic explosions go, but ship and men and rock puffed and sparkled in bright, cleansing flame.

The bridge of the captured enemy ship looked fresh and clean. The remains of the Asiatic commanders' gruesome self-destruction had been cleared away; blackened places about the room glistened with new

paint. It was several hours after the battle.

Sanderson stood at attention reading a report to his surviving officers. Sergeant Fontaine, permitted to attend as the first witness to the baffling slaughter, fidgeted in the presence of so much gold braid. Private Carson, the strange child of the laboratory, present to assist Fontaine in guarding the disgraced executive officer, stood stolidly, a detached expression on his face.

"—and therefore the atomic explosion, when it did come, was hardly noticed here," the commander concluded his report. "Lieutenant Watson did his duty"—he glared covertly at Culver, manacled between Fontaine and Carson—"and if we can return safely to our Advance Base this will go down as one of the greatest exploits in the history of warfare."

He cleared his throat. "At ease," he said offhandedly, straightening his papers. The officers and crewmen relaxed, shifted position, as Sanderson went on more informally: "Before we discuss any future action, however, there is this business of the Asiatic warlords—their inexplicable suicide. Lieutenant Carpenter?"

The psycho officer stepped forward, caressing his bandaged jaw. "I have questioned the ten prisoners we took," he announced as clearly as he could through the bandages, "and my men have applied all of the standard means of coercion. I am firmly convinced that the Asiatic prisoners are as ignorant as we are of the reason for their masters' strange behavior."

Sanderson motioned him back impatiently. "Ensign Becker?"

The personnel officer rustled some sheets of paper. "I have checked the records carefully, sir," he asserted, "and Lieutenant Commander Culver is the only man aboard this ship who understands written Asiatic."

Sanderson's gaze swept over all his officers. "Gentlemen, the executive officer was guilty of striking the psycho officer shortly before we abandoned ship—I witnessed the action. I want to know if you will accept as valid his translation of the radiogram which Sergeant Fontaine found on the body of the enemy leader."

"I object!" shouted Carpenter immediately. "Culver violated one of the *basic* principles of the officers' corps—he can't be completely *sane*."

"True, perhaps," admitted Sanderson testily, "but, lieutenant, would you care to suggest a plan of action—*before* we discover why our late enemies killed themselves so conveniently?"

"Commander, are you trying to vindicate this man?" Carpenter demanded indignantly.

Sanderson looked at the psycho officer with an expression almost contemptuous. "You should know by this time, lieutenant, that I have never liked Mr. Culver," he snorted. "Unfortunately this could be a question of our own survival. If the officers present accept Culver's translation of the message, I shall act on it."

"But we came here to begin court-martial proceedings—"

"That can wait," the skipper interrupted impatiently. "This is my command, Carpenter, and I wish you'd remember that. Well, gentlemen? A show of hands, please—" He paused to count. "Very well," he decided shortly. "Sergeant Fontaine, give the message to the prisoner."

Fontaine threw a snappy salute and handed the yellow scrap of paper silently to the exec. Carson loosened his grip somewhat; Culver began to work out the translation—

FROM: Supreme Headquarters in Mongolia

TO: All field commanders

SUBJECT: Secret weapon X-39, failure of.

1. Research project X-39, a semiliving chemical process attacking all forms of protoplasm, was released on the South American front according to plan last night.

2. Secret weapon X-39 was found to be uncontrollable and is spreading throughout our own armies all over the world. In addition, infection centering on the secret research laboratories has covered at least one third of Asia.

3. You are directed to--

"Well?" demanded Sanderson.

"That's all, sir." Culver replied quietly.

The room immediately exploded into conversation, all pretense at military discipline forgotten. The commander shouted for order. He stood even straighter than his normally stiff military bearing allowed; he was the picture of triumph and confidence.

"This interrupted message can be

For quick, slick shaving, here's a scoop,
The toughest whiskers are duck soup
When you use thrifty Thin Gillette—
The best, low-priced blade you can get!
Protect your skin from irritation caused by misfit blades
Gillette
BLADES
4 for 10¢
Produced By The Maker Of The Famous Gillette Blue Blade

interpreted in only one way," he declared ringingly. "Ensign Becker, you will inform all hands that the enemy's suicide is worldwide and that *the war is over!*"

For a long, long moment there was dead silence. The last peace rumor had died when most of these men were children. It took much time for the realization to sink in that the senseless murder was over at last.

Then — cheering, laughing, slapping one another's backs, the officers gave way to their emotions. Many became hysterical; a few still stood dumbly, failing to comprehend what "peace" was.

Battle-hardened, stiffly militaristic Sanderson's face was wet with tears.

And then Lieutenant Carpenter screamed.

All eyes were riveted on the psycho officer, a hideous suspicion growing in their minds as he cringed in a corner and yelled meaninglessly, his whole body shaking with unutterable terror. They had all seen men afraid of death—but in Carpenter's mad eyes was reflected the essence of all the hells conceived in the ancient religions—he slavered, he whimpered, and suddenly his body began to *ripple.*

His fellow officers stood rooted to the deck in sheer fright as he *slid* rather than fell to a huddled heap that continued to sink down after he had fallen, spreading and flowing and finally *running like water.*

Sanderson stared in stunned horror at a pool of sticky yellow fluid that dripped through a bronze grating in the floor.

Culver grinned foolishly. "Yes, commander," he said airily, "you were right—the war is over."

Sanderson gingerly picked Carpenter's notebook out of the sodden pile of clothing and bandages and the broken glass of the psycho officer's spectacles. "Read that radiogram again," he ordered hoarsely, signaling to the two crewmen to release their prisoner.

The exec rubbed his wrists to restore circulation as the handcuffs were removed. Then he picked up the crumpled paper, smoothed it out.

"Research Project X-39, a semiliving chemical process attacking all forms of protoplasm, was released — Culver choked over the words. "Sir, I—"

And then in a few terrible minutes of screams and curses and hideous dissolution, all the officers understood why the Asiatics had committed suicide.

Sergeant Fontaine for some reason kept his head. He fired four shots rapidly from his pistol; one missed Carson, the others found their mark in Sanderson, Culver, and Becker, who looked oddly grateful as their bodies jerked under the impact and they slumped in unholy disintegration.

Sanderson saluted solemnly with a dissolving arm.

Fontaine had one more pellet in his gun. He hesitated, looked inquiringly for a moment at the inscrutable Carson, then as he felt a subtle *loosening* under his skin he

turned the weapon on himself and fired.

Private Carson puffed nervously at a cigarette, staring in shocked, horrible fascination at the weird carnage—then ran blindly, fleeing from he knew not what.

The terror flew on wings of light through the ruined enemy ship. Technicians, bridge watches, the ten enemy prisoners, psych corpsmen, navigators, combat crewmen—even the dead Oriental commanders joined the dissolving tide. Richards and Sheehan were the last to go; they hysterically accused each other of causing the horror, trying desperately to find some tangible cause for the Doom—they fought like great beasts, and fat Koch was not there to stop the fight—they struggled, and coalesced suddenly into one rippling yellow pool.

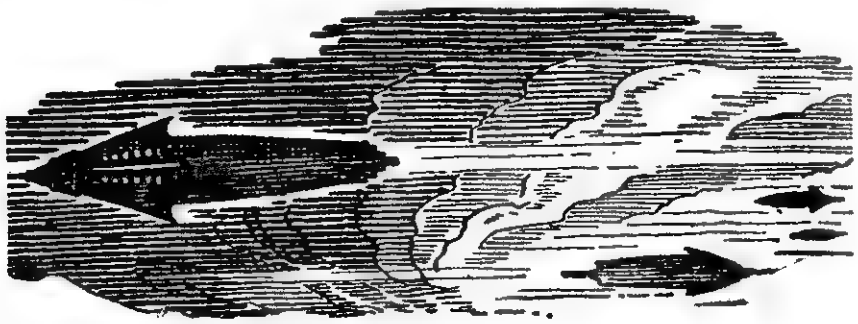
Carson, still incased in his armor, raced and clattered through the deserted ship—the sound of his passing was almost sacrilegious, like the desecration of a tomb. Everywhere silence, smashed walls, empty suits of armor, little bundles of wet clothing, and curious yellow stains. *Die, why can't you die?*

Carson, the strange one — separated by more than aloofness from his fellows—spawned in a laboratory, the culmination of thousands of experiments in the vain hope of circumventing the extremity of the slaughter by manufacturing men. His metabolism was subtly different from that of normal man; he *needed* nicotine in his system for some reason—that was why he chain-smoked —but tobacco was a narcotic; it could not protect protoplasm. *Why can't you die, Carson?* All through the ship, silence, wet clothing, little pools—not even the dead had escaped—nothing moved or lived except this running, half-mad man—or Thing—born in a laboratory, if one could say he *had* been "born."

A quick movement of his gloved hands sealed the round helmet on his shoulders. He ran and stumbled and climbed through passageways and down ladders; he fairly flew down the landing ramp and soon disappeared in the black depths of the tunnel.

And the nighted cavern so recently hacked from the outraged crust was given back to the darkness and the silence it had always known.

THE END.



IN TIMES TO COME

Raymond F. Jones has a yarn coming up next issue called "The Toymaker." His toys were lumpy, little figurines of a plasterlike composition, badly carved, badly painted, and uninteresting so far as any adult could see.

But the kids were crazy about 'em. They were called "Imaginos," and the proud, juvenile owners seem to center whole fantastic civilizations about the lumpy figurines, imagining them building great cities and conducting dashing, wonderful adventures.

Unimportant things, of course, in the whole great picture of a busy, highly-advanced world, expanding its empire outward through space, ruling directly or indirectly a dozen planets. Unimportant—except for the fact that the Imaginos, somehow, controlled the imaginations of the children of a world, like lumpy, crudely shaped Pied Pipers.

And—somebody was using them for his own propaganda ends!

THE EDITOR.

THE ANALYTICAL LABORATORY

The May, 1946, Astounding Science-Fiction carried seven stories—more than we usually have. The story rating system we use, as you may remember, involves giving 1 point for first place vote, 2 for second, and so on, then averaging the point score so accumulated. If there are only five stories in the magazine, the highest—worst—vote score possible would be 5. In the usual scattering of votes due to differing opinions, average scores come out about 2.50 to 3.50.

With more stories, point scores run higher. Hence some higher readings this time. The fact that we have a triple tie makes for a scattering of votes that causes higher scores too; there was less clear-cut decision as to places.

The score finally stood as follows:

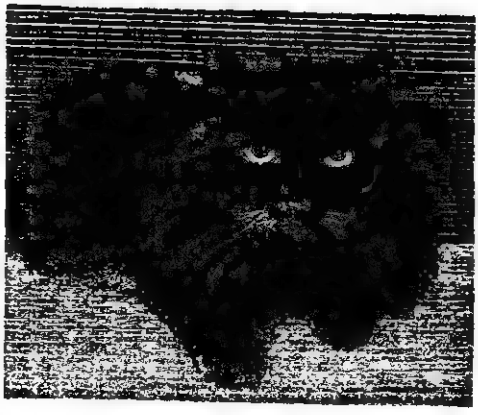
Place	Story	Author	Points
1.	Pattern For Conquest (III)	George O. Smith	2.50
2.	Rescue Party	Arthur C. Clarke	3.00
3.	The Cure	Lewis Padgett	4.00
4.	Triple Tie:		
	Nightmare	Chan Davis	4.53
	Alexander The Bait	William Tenn	4.53
	Placet Is A Crazy Place	Fredric Brown	4.53
5.	A Son Is Born	A. E. van Vogt	4.86

The scattering of votes was complete; only one story failed to get a first-place vote; only "Pattern For Conquest" failed to get a seventh-place vote.

THE EDITOR.

A cat can, of course, look. But this was a remarkable cat: it didn't look. It watched. There's a rather important difference—

by RAYMOND F. JONES



The Cat and the King

"The cat is symbolic," said Jason Cartwright. "I shall keep him." His eyes went from the motionless silhouette of the giant Maltese sitting in the window overlooking the gray city. They settled on the mud-spattered, ill-clothed form of his brother.

"I find I can't trust men these days," Jason continued. "Seems to me like there used to be an old saying—'even a cat may look at a king'—and it's almost arrived at the state where *only* a cat may look at this king.

"And don't say I'm not a king, Robert. I'm king of the greatest industrial and commercial empire the universe has seen, and it's growing every hour. Yes, I'll most certainly keep Old Tom. He doesn't talk back, and he keeps quiet about what he sees. All I have to do is rub his ears to get more affection than all the human beings alive would give me.

"If that's all you came for, get out. I'm keeping Old Tom."

But Robert Cartwright didn't rise. He only shifted his muddy feet upon the luxurious carpet that covered the office floor. "As you say, the cat is symbolic. You began your career of commercial imperialism as a boy with a stolen cat—mine. And so you crush me financially and take the one insignificant thing that I desire to keep, Old Tom. But have you ever thought of the complete symbolism of the cat? You end your career just as you started it—and perhaps you are nearer the end than you think."

"What do you mean by that?" Jason's face went dark as he thrust his blunt head towards his brother. "I don't like threats."

"I don't have to make threats. Your own weight will crush you. You've built an industrial empire upon blood and theft, and you're out of date if you think you can maintain it. Imperialism in commerce was at its height when you and I were boys and saw our father destroyed by it. But now it's dying so fast that you are going to be caught right in its death throes. You began with a stolen cat, and you shall end with only a stolen cat."

"So cries the poor peasant as the king passes by," sneered Jason. "You'd be quite willing to trade places, I'm sure, but you've never even gotten the mud off your feet since you came to Venus, have you?"

Robert glanced about the room and at the fine desk of polished Venusian mahogany. "You don't get muddy feet sitting in a polished office built upon the sweat and blood of other men," he said thinly. "You get it working, tramping through the swamps of Venus, building and discovering."

"Then go back to your building and discovering and tramping through the swamps. I'm leaving you your own laboratory and instruments. Make new discoveries and get your name in a dozen scientific journals. That's what you want, isn't it? As for Old Tom, I had my men bring him along when they found him in your plant. His great grandfather was the first thing I ever took away from you. Old Tom will be the last, for I'll never again allow you to accumulate a nickel. That's what happens to men who fight me."

"A specific antitoxin for Jungle Dread doesn't mean a thing as long as it deprives you of a few of those precious nickels, does it?"

Jason Cartwright shook his head. "Not a thing. Jungle Dread happens to be responsible for a considerable part of my income. The drugs my company sells do not bring a permanent cure for the disease and so a continuous repeat business is possible. It's far more profitable to sell a repeat item than a single shot. But more important by far is the fact that the antidote we sell becomes a direct control over the Venusians. If they get out of hand, we just dilute the antidote or withhold it and they come around in short order.

"You're just no businessman, and that's why I own fine, beautiful things, which you only track up with your muddy feet. You can get out, now, Robert. You're through, washed up. After you attempted to buck me by manufacturing serum on your own, you signed your own sentence."

"Will you give me passage to Earth?"

"And have you spread the news of your discovery there? I'm not crazy. I don't care what happens to you. You can spend the rest of your life in the jungles hunting new bugs if you want to. The freedom of Venus is yours. Nothing you can do will harm me, but you can never obtain more than enough to barely live. The

moment you try, I'll snatch it away from you and throw you back into the jungles. You can attempt to send your story of the serum to Earth, but you'll be a dead man if it reaches there. There's no place on Venus that you can hide from me. Do anything else you like, but don't cross me again. It will be the last time, if you try."

The face of Robert Cartwright was impassive as his brother pronounced sentence upon him. He knew that Jason's word was final. There'd be no mercy.

Robert Cartwright rose. "I'll remember, Jason. You know, of course, that I won't send the story of my discovery to Earth because I'm enough of an idealist to value myself as of greater worth to mankind alive than dead. But I want you to remember this, Jason: Never before have you interfered with my scientific work and I have let you alone. Now, it is different. I'll not allow you to interfere with my work."

"Get out! I haven't time for your empty threats."

"I'm going. Just one more thing for you to remember: You said the cat was symbolic, and you're right. Old Tom may be in your possession, but I am still his master. Never forget it, Jason."

With that parting word, Robert Cartwright turned, grinding the mud of his heel into the thick pile of the rug, and strode towards the door. He never looked back.

The door closed behind his brother, and Jason rose and went to the window. He scratched the cat's ear. The big cat struck back playfully, raising blood on the back of Jason's hand. The magnate laughed. "You play rough, eh? You and I should get along."

Then from the window that formed an entire missile-proof wall of his office, he watched the proud, shabby figure of his brother. Robert Cartwright stood hesitantly in the mud of the Venusian street, then turned his back on the magnificent edifice that housed the central offices of Cartwright Enterprises. He moved away and was lost in the crowd of Venusians and Earthmen.

Jason Cartwright returned to the desk and leaned back in his swivel chair. The cat moved over and jumped up to sit on the desk, his proud head erect with tremendous feline superiority that matched Jason's own concept of himself.

The incident of blocking Robert in his manufacture of Jungle Dread serum was merely a minor event in the operation of the great company of which Jason was the founder and dictator. As far as the sale of the serum went it wouldn't have mattered a great deal if Robert had gone on with his production. The income from antidote was a small fraction of a percent of the total, but the threat of withholding the antidote was the force that held the hundreds of thousands of Venusian workers in line.

Robert had openly accused Jason of this, and such charges could not go unanswered. Such brashness

could not go unpunished. Besides, there was a particularly satisfying feeling in having smashed Robert completely once again.

When they were boys, Robert had been the favorite of their father, a man who dreamed great dreams and dreamed them too well for his own good and that of his family. His dreams had touched the domains of the great transportation and power companies and they had crushed him mercilessly. He had died in near poverty.

From this, Jason had taken his lesson for life. He would never be crushed as he had seen his father crushed. He would be the merciless conqueror, not the broken dreamer his father had been.

With small beginnings in the early days of space flight, he had expanded one small enterprise after another, building each to a ruthless success, then combined and built anew until his empire at last stretched across the Solar System and his enemies were legion.

In contrast, Robert had remained the dreamer like their father. He, too, had gone forward on the breast of the great tide of exploration that followed in the wake of the first space flights, but he went in the interest of science, of discovery. Each new world upon which he set foot was a thrill that touched his soul with the magnificent humbleness of the discoverer. He came to seek knowledge and to find better ways of life for man and the inhabitants of alien worlds.

It was upon Venus that the bulk of human colonization had taken place, and the greatest of the extra-terrestrial tragedies. Here, the natives were placid, aboriginal creatures whose life and evolution had almost been brought to a halt by the disease known as Jungle Dread. Ninety-nine percent of the native Venusians suffered from it and nearly as many Earthmen contracted it after arriving there.

Some of Jason's chemists had devised an antidote that stayed the mind-numbing attacks of the disease and it had been hailed by the worlds as a means of bringing civilization to Venus. The Venusians were grateful and their advance had been remarkable, but constant consumption of the antidote was necessary.

Leaping ahead as if released from age-old chains, the Venusian civilization developed with incredible rapidity. The shiftless, lethargic attitude of the people changed to an energetic, merciless driving of themselves as if they would make up for the lost centuries. Always skilled craftsmen in producing small artifacts, their innate talents now blossomed forth—to the great financial advantage of Jason Cartwright who hired them by the thousands in his fabricating plants.

But with all this Robert knew that the planet would never achieve as it should as long as Jungle Dread had to be held back like an ever present foe at the gates of a city. A specific serum was needed. He succeeded in isolating the virus of Jungle Dread and producing a serum that gave lifetime immunity.

Unaware of Jason's use of the drug as a whip over the Venusians, he had asked Jason to manufacture it because he had no talent or bent for industrial or commercial enterprise. Jason had laughed at him and immediately confiscated his plans. Robert discovered the reason and went ahead then with a small plant of his own for the manufacture of the serum. This, too, was wiped out by Jason in a single blow.

It was inevitable, Jason thought. The dreamer always gets cut down in the battle of life. Just as their father had been cut down. There were only the two possibilities for men in the world. He and Robert represented those two. The conqueror, ruthless and unyielding, or the dreamer, imaginative and beaten.

The giant cat twitched its whiskers and looked at Jason as if aware of his thoughts, and in thorough agreement.

Jason could not have explained his pride in possession of the cat. It was not that he loved the pet—he was scarcely capable of such an emotion towards any object. But the cat represented conquest. It was his symbol of triumph, and dated from the boyhood of himself and Robert.

Their father had given Robert the magnificent ancestor of Old Tom, and Jason had wanted him. There came a time when Robert needed money for materials for the boyhood laboratory.

It was more than useless to ask their father, but Jason had saved from his meager allowance and offered to loan it to Robert with the cat as security. Knowing Robert's inability to comprehend anything but his scientific work, Jason was certain the cat would be his. And when the time limit was up on the loan he promptly foreclosed and took possession of the cat.

That had been long decades ago, but to Jason it still carried the thrill of conquest. Old Tom, descendant of that first pet, was a satisfying symbol of that conquest.

Jason had not known at the time that Robert had some kittens fathered by their pet, so that when his men raided Robert's plant and found the giant Maltese, he was exuberant. It was like reliving that first experience all over again. It was symbolic of what Robert had become and what Jason had saved himself from becoming.

Old Tom yawned luxuriously and looked questioningly at Jason as if desirous for activity, as if waiting to witness some of the manipulations of the fabulous empire of Cartwright Enterprises.

Jason turned to a locked cabinet beside the desk and opened a drawer. He pulled out a file of papers and began scanning them. After a moment, he spoke into the interphone system and demanded, "Marks, get Reamond."

Shortly, a small, ministerial looking man with a bald pate glided into the room soundlessly. "Yes, Cartwright?" he said.

Jason motioned him to a chair.

The man seated himself and found the Maltese cat staring him in the face. "Where in the world did you get this thing?" asked Reamond.

"Took him away from Robert. The cat's ancestor was with me for years in every move I made before he died. I'm glad to have this cat. Not that I'm superstitious, but a good luck piece around the place won't hurt anybody."

"It gives me the creeps. He just *stares* at you."

"You'll get used to him. He stays here from now on. But that isn't what I want to talk about.

"You recall the incident of my brother and the absorption of his manufacturing facilities. I want a sufficient number of men put on Robert's trail for a time until it can be determined what his plans are. He made a threat as he left, and I want to be certain that he makes no drastic attacks upon us."

"Yes, I'll see that it's taken care of."

"Remember Bridgeman?"

Reamond scowled, "Yes, he's the bacteriologist who got pretty riled over your brother's case. He insisted we should make the serum and threatened to resign if we didn't."

"Right. He hasn't left yet, has he?"

"Of course not. You know his kind. All high ideals and bluff, but no guts when it comes to a showdown."

"I'm not so sure. At least I'm doubtful enough to believe he should be dealt with. You'll take care of it as in the past?"

"It will be difficult. I think an accident outside the plant would perhaps be best. You feel sure there's no better way? These things are becoming more difficult all the time. Venus isn't quite the frontier country it once was, you know."

"Please take care of it as I asked," Jason demanded. "That's what you're paid for. I think Bridgeman is too dangerous to keep around with the knowledge he has. He is the only one who is thoroughly familiar with Robert's process."

"As you say, Cartwright. What about your brother?"

"He's harmless. I'd rather let him go and enjoy watching him squirm. He'll be at some new program within a year, beating a drum to save the Venusians from some other thing on this foul planet, or else lost in glory over a new bug he's found in the jungle. It amuses me to watch him, especially now that I have the cat. Because it's symbolical to us he'll be sure to make some move to try to get it back."

"There's another matter," said Reamond. "The Workers' Council in the Drian plant are protesting conditions there. They've found some descriptions of Terrestrial plants somewhere and they want equal conditions."

"Drian! We can't have trouble there! The Jovians are coming to pick up their first delivery of distorters soon. Their attack upon the Martians is less than a month away. Dilute the Venusians' anti-

dote for a day. That ought to bring them to their senses."

"It won't be that easy this time, that's why I mention it. They have a new angle. They have an *immune* as a control. If he sees the effects of diluted antidote in any of them, he yells for help."

"From whom? They aren't organized so much that one group will strike or show force to help another, are they?"

"Not yet, but they're working in that direction. Anyway, the *immune* could stir up a fuss, yelling to the police, the Terrestrian news sources and so on. You can see what it would do."

"If something happened quite regularly to these *immunes*, such as accidents in hazardous work, they might become discouraged."

"That is my solution, but it doesn't seem to me that it will continue to work forever. We're in a sort of transition period now and it's going to be dangerous unless we retrench and spend more money for plant improvement. The Venusians are brilliant mentally. They've just been held down for thousands of years by this Jungle Dread, and now they're beginning to catch up. It might be that in the not too far distant future they'll even pass us."

"I depend on you to prevent such contingencies. If new and more drastic methods are required, go ahead."

Reamond rose. "I'll do as you say, but private police killings won't stop a revolution and that's where we're headed."

"You're talking like an old woman, Reamond. If I hear much more of that, I'll have to find someone else to fill your shoes."

The secret police head grinned mirthlessly. "You'll never find another to fill my shoes like I fill 'em."

As the door closed behind the man, Jason thought grimly that he was right about that. There was probably not another killer in the entire universe quite so efficient and ruthless as Reamond.

Yet for Reamond to suggest a backing down from their policy of ruthlessness with the Venusians didn't make sense. Surely the man couldn't be getting old and squeamish, Jason thought. Perhaps in this one instance he was right, however, for, if there was one plant in his whole empire that had to be kept running, it was the Drian plant. For there the Venusians were p r o d u c i n g deadly distorters, weapons which would go in great quantities to both sides of the imminent Jovian-Martian conflict. That war would make Cartwright Enterprises the greatest commercial empire in the universe, for the distorters rendered all other weapons obsolete. And no one could supply distorters except Cartwright. His scientists had designed it and only the Venusians could build it. Only they possessed the infinite skill that could perform the handwork necessary to the creation of the weapons.

All distorter production was centralized in the Drian plant. If

it were thrown out of production by trouble with the Venusians, Cartwright's dreams of multiplication of his empire would disappear. Yes, the Drian plant had to be kept in operation at all costs. Perhaps Reamond was showing good sense after all in his suggestion that they backtrack and give in to the Venusians. But he'd let Reamond go ahead with diluted antidote. If that didn't get results, it would be time to give in.

The cat jumped down into the chair Reamond had just vacated and settled himself in a squatting position, watching with interest as Jason opened another drawer of the cabinet which proved to be a miniature bar complete with ice-cube machine. He mixed a stiff drink of the Venusian fermented drink, Teoqua, and downed it. It was a mid-morning ritual with Jason, which he was finding more essential and more satisfying as a mental pickup all the time. True, his doctor had strictly advised against liquor of any kind, but Jason wasn't inclined to believe that doctors know everything about the human body. No one knew about this private stock except Jason. He winked at the cat and shut the drawer.

At that moment the private outside phone, known only to a very few intimates, rang softly. Jason answered and the exotic face of Robin Murello appeared on the screen. "Hello, darling—" she said.

"Robin, I wish you wouldn't call me here. I've asked you before."

"But darling— I had to tell you that I won't be dancing this week end. I'll be free. We can be together if you like. Or perhaps you don't like," she pouted suddenly.

"Of course, Robin. There's nothing else in the world I'd rather do. Same place— The Lanceford in Sunward City."

"I'll be waiting for you." She cut off with a tantalizing smile.

Jason sighed. Robin was expensive, but he could afford her, and she was the one thing that seemed to make things worth while at times. He hated to admit the strain of ruling his ruthless empire was telling on him. But with the help of Teoqua and Robin Murello, he'd see it through.

Jason knew he ought to stay in town over the week end and work on the problems of this new development at Drian. But he felt tired and wearied of mind and body. Another couple of days wouldn't hurt anything. He reached for the phone and called home. He told his wife, Lotta, he had to go to Caramond for business reasons for several days. He had connections there that would alibi him in case Lotta should try to check up on him. She had done it before.

He notified her of the cat, and sent Old Tom home in the care of his private chauffeur with instructions to provide its care.

Sunward City was the Riviera of Venus. Situated in an equatorial, volcanic region, it was the one locality where the eternal fogs of

Venus did not persist. The sun shone bright and warm on the sands of the Eastern Sea and the great resort that was Sunward City reeked with exclusiveness. The tremendously wealthy of both Earth and Venus wintered there, for it combined the best of a score of vacation climates.

Robin was there, lying on the white sands, watching the lazy surge of the sea when Jason found her. She was the most beautiful thing he had ever seen on Venus or Earth, he thought. But she was like himself in every respect. There was nothing of loyalty or trustworthiness in her, and she was constantly on the lookout for a higher bidder for her affections. So far, Jason had managed to outbid the field, but Robin was becoming a very expensive diversion.

"Darling!" she greeted him in surprise. "I didn't know you had come. Shall we swim?"

"Do, if you like. I think I'd like to just lie here and bake in the sun. It seems so long since I saw any real sunshine."

He lay on the sands, feeling the sensual warmth and the nostalgic sensation of the rough sand particles against his skin. It brought back memories of his boyhood days and the infrequent visits to the poor resorts of Mars, of hours wallowing in the cold dunes.

He felt intense pride of possession in Robin. Her fiery beauty was something to possess with pride. But there was no contentment in it, he thought wearily. Her eyes were unceasingly scanning the beach for new and more intriguing companions. Anger surging silently through him, he wished he had gone to Drian. He was gambling his dreams for a week end with Robin.

And then on the second night as he and Robin were together after a late supper, a squad of photographers and private detectives forced the apartment door and burst in. Lights flashed in their faces. In the background, Lotta's prim, indignant figure stood erect in majestic triumph.

"It's taken me a long time, Jason, but I've found you at last. The divorce will be handled by my lawyer. I'll expect transportation to Earth and possession of our estates there. Goodnight, Jason."

It was all over so quickly that it might have been only a flashing dream. But he knew it was real.

Jason felt unaccountably lonely as the door slammed and he and Robin were alone again. He shrugged her away as she attempted to put her arms around him. "Don't worry," she said. "We can be together all we like now, can't we?"

He rose. "I'm afraid not. I'm afraid we won't ever be alone together again. In fact, I think I'll say good-by to you now before you have a chance to give me the last word."

He picked up his coat. Robin screamed at him shrilly as he opened the door. "Jason! Come back here! I'll blackmail you for everything you've got. I know—"

He didn't hear the rest of her screamed threats. Perhaps it would be necessary to have Reamond take care of her, he thought.

Back in Viamonde, Jason forced himself to concentrate on the affairs of business. Today was the day an important delegation of the Jovian Satellite Federation was coming to demand delivery on their contract.

The original contract had been for a hundred thousand distorters, but Jason had no intention of delivering that many—yet. The Martians had been able to accept only sixty thousand on a cash and carry basis, so it wouldn't do to let the Jovians have more. That might end the war too quickly. Though he didn't actually need an excuse to bluff his way along with the Jovians, the labor troubles with the Venusians gave him one.

He tried to concentrate on what was to be done, and constantly his mind slipped back to Lotta. Her departure upset the background of his life. It was very true that for many years Lotta had been nothing but background, nevertheless she

was familiar and comfortable background. He missed her, and he knew it would be ridiculous to ever consider Robin in Lotta's place.

What disturbed him most of all, however, was how Lotta had finally discovered his whereabouts. He felt sure that up to this time his deception had been perfect. No one knew of his presence in Sunward City except him and Robin. Someone must have recognized him somewhere along the line and notified Lotta.

He would give her a divorce without question. But it was defeat for him, and defeat struck him like a disease to which he had no immunity. It fevered his mind and constricted his vitals.

He glanced at the cat, Old Tom, who sat in the window washing his paws with meticulous care. That symbol of initial conquest brought his mind back to the present fruits of conquest and the precarious situation with respect to the Venusian workers.

Jason called Reamond first for a report on the Bridgeman business and the results obtained in the case of the diluted antidote.

Reamond's ministerial calm was unusually disturbed as he came in answer to Jason's call. His face was flushed and he was walking very fast.

"What's wrong?" Jason asked before Reamond spoke.

"Plenty. My men bungled somewhere. They had arranged a flier crash for Bridgeman by disturbing the autocontrol with a false heterodyne of the guide beam."

"I don't see what could have gone wrong with an arrangement of that kind."

"Plenty. There was a patrol car following Bridgeman. It put out a beam to avert the crash, and then caught my men by direction finders."

Jason felt his scalp tingle. "The fools! How did they give themselves away like that?"

"Someone tipped Bridgeman off to the whole plot."

"Tipped him off? That's impossible. No one knew of it but you and me and the bungling fools you assigned to the job. None of us would have tipped him off."

"Obviously. Yet he was tipped off."

Jason sat back in the swivel chair. His mind, already in turmoil because of the defeat administered by Lotta, was stunned by the implications of this. How could information possibly have leaked on such a secret operation as Bridgeman's removal?

"It's obviously a trick," he said at last as if repeating something only to reinforce his own belief in it. "You and I know that Bridgeman could not have obtained information concerning our plans. There is no audio-detection operation in the plant, and certainly not in this room. Triple alarm screens would go off if there were any low- or high-frequency radiation present to spy upon us. The telephone circuits are scrambled before they leave this office. There is no leak."

"Then how did he know?"

"Deduction. He assumed that we would be after him because of his upholding my brother's production of serum. Therefore, he obtained a constant guard until we tipped our hand. Then your men were caught. He's smarter than we gave him credit for. All of which means that he must definitely be eliminated. But you'll have to think of something a lot better than that last trick. What of the men the Patrol captured?"

"They swallowed cyanide before they could be made to talk, of course. They knew it was death to be caught in such a crime."

"At least that avenue of information was stopped. Of course, they didn't know they were working for Cartwright Enterprises."

"Of course not. They thought I was a small-time gangster. I keep a front down in the dock area."

"Good. It means then, that there was really no leak, simply an underestimation of Bridgeman. What charges has he made against us?"

"None, so far. That's what I don't understand."

"It's easy. He expects us to make another attempt, and the patrol won't believe that we're connected with it. But they'll give him a plenty big guard after this attempt. Your next idea will have to be a good one. What about the Venusians and their labor organization?"

Reamond shook his head slowly and stared out of the window over the silhouette of the cat, who was now immobile, as if on guard against some unexpected happening.

"Nothing," he said.

"Nothing! What do you mean?"

"Just that. Nothing. Do you know what they've done, Jason?"

"What?"

"They're *making immunes.*"

Jason's glance swept to Old Tom, who returned his stare. Jason's face slowly flushed and his jaws clenched. "This is some of Robert's work. I warned him. He's given the secret of his serum to the Venusians. Get him!"

Reamond shook his head. "Lock the barn after the horse is gone? What good would it do? Besides, Robert had nothing to do with this. The Venusians discovered it themselves."

"His serum?"

"No. All they do is inject some of the blood of an *immune* into an infant. Apparently, the presence of antibodies in the natural immunes is a mutation that has finally shown up and will eventually destroy Jungle Dread, but the Venusians have been speeding it up. They've been doing it since the first Earthmen arrived and brought the rudiments of bacteriology and immunology with them. It's so simple that it's a wonder it wasn't thought of long ago. But the Venusians are rapidly becoming a race of *immunes.* There are hundreds of thousands now reaching maturity. So from the long view of things the Drian circumstance means nothing. It will do no good to go in there and fight them.

We've got to offer them something, much more than they've asked for or we're gone. They can live without us, but we can't do business without them—yet. Our days of unlimited exploitation are over. We must have sense enough to realize it."

Jason pinched his thick jowls. "I still think Robert had something to do with this."

But that was not important, now, he thought. What was vastly more important was the contracts and materials being worked in the vast Drian plants, materials whose destinations were known only to a handful of top executives of the company.

"Perhaps you're right," said Jason at last. "We'll offer them improved working conditions and increased pay that will make their eyes pop. But we'll stick in one provision—that no *immune* will be hired. That will discourage the production of *immunes*, and prolong our period of control."

Reamond smiled slowly and watched the powerful visage of Jason Cartwright. Reamond's trade had made him a student of men by necessity, and he could see in Jason already an obsolete type. The type had flourished during the cutthroat commerce of frontier days in every part of Earth and the Solar System, but now it was going. The frontiers were breaking down and civilization was coming. More so on Venus than on any other frontier because the retarded evolution of the Venusians was catching up. It seemed very probable that the Venusians would surpass Earthmen in numerous skills and branches of knowledge before many decades passed. Their evolution was rendering Jason and all like him rapidly obsolete. But Jason would be the last to know it.

As for Reamond, he prided himself on his ability to change his characteristics to fit conditions, like a chameleon. Jason would go. Reamond saw his downfall as inevitable. But Reamond himself would go on forever, he knew.

He said. "Whatever you like, Jason. I'll see that it's put through."

"All right. Go ahead. No, wait. Let me announce it to the workers myself. We'll make a big occasion out of it. I'll work out a program of changes and present it to them—but the provision for non-employment of *immunes* must be included."

Reamond rose and started for the door. "I'll be ready to do my part in the program whenever you say."

After he was gone, Jason's mind went back to the failure in the case of Dr. Bridgeman. It was intolerable. Certainly, Reamond had hired a pair of fools to carry out the task—but the plan *couldn't* have leaked. There was no possible way for it to have leaked out. Yet it was hard to credit the soft spoken, dreamy-eyed Bridgeman with enough suspicion of anyone to anticipate the attempt on his life, merely because he had stood up

for what he considered to be right. True, he had made the threat to resign, but it had never been carried out.

And from this, Jason's mind leaped to the mysterious manner in which Lotta had caught him at Sunward City. The two instances of others knowing intimate and well-concealed facts swirled in his mind in a confusing pattern of defeat.

The outside line buzzed and Jason switched on the phone. The face of his personal physician, Dr. Wallace, appeared on the screen.

"Hello, Jason, how's the health these days?"

"Fine, fine. Doc. Haven't the slightest need of you. Going to live to be a hundred and fifty."

"Well, I think you ought to come in for your six-monthly check."

"Make it next month sometime. I'm just too busy right now. I couldn't possibly make it."

"You pay me plenty, Jason. I like to earn my keep. But the thing I really wanted to say, is: Lay off the Teoqua. I hear you're hitting the bottle again."

Jason felt his face suffusing. "Where did you hear that?"

"Oh, that sort of thing gets around. People notice it when someone like you goes off the wagon. I forget exactly where I did hear it now, but you ought to lay off the stuff, Jason. It's worth ten years of your life."

"Where did you hear it?" Jason thrust his face towards the pickup until his face filled the screen on Wallace's phone.

Wallace recoiled from that sudden burst. "I said I didn't know, Jason. Surely it isn't such a breach of confidence if your personal physician warns you—"

"Sure not. Sure it isn't, doctor." Jason forced his voice to calmness. "It's just that I naturally get irked about people sticking their noses into my business. Sorry. I'll take your advice."

He cut off abruptly and sat back in the chair, trembling. He was absolutely certain that since Dr. Wallace had last warned him against Teoqua no human being had seen him touch a drop of it. The only time he imbibed was in his private office, alone, and from the hidden miniature bar in the filing cabinet.

But, of course, he had to have the stuff purchased. That's how Wallace had got wind of it. He tried to recall the chain of handling. Lotta ordered the stuff, ostensibly for the household and guest supply. She had ordered a particularly big amount the last time because they'd given two large parties within a week. That was it. Someone in the liquor dispensary had observed the order going to the Cartwrights', and that's where the news had started.

He cursed violently all the loose-tongued gossipers that had disturbed the Solar System since the beginning of time. Why couldn't people learn to shut up? He glanced at Old Tom lying down now in the window, his eyes blink-

ing sleepily as he tried to stay awake in spite of the warm sun shining upon him through a sudden rift in the eternal clouds of Venus.

"At least *you* don't babble what you hear." Jason crossed and stroked the cat's ears while he stared out at the muddy street below.

After a time he glanced impatiently at the clock. The delegation of the Jovian Satellite Federation were already an hour late. They had not even announced their landing to the field control tower. At last he gave up and went out for lunch.

He took Old Tom along and let him consume a mountainous helping of raw hamburger at the private table of the company officers in the cafeteria.

When he returned, the Jovian delegation was waiting for him.

The roughly anthropomorphic Satellite dwellers bowed low when Jason entered.

"Our deepest apologies for not keeping our appointment on time," said Suu Brok, the spokesman. And as he bowed low, Old Tom strode under his nose and took up a position on Jason's desk.

The delegates had difficulty in maintaining composure.

"My closest confidant," said Jason, with a wave towards the cat. "He never repeats what he hears, you know."

"An excellent choice," said Suu Brok. "Especially in view of the many important matters that invite confidence in your magnificent office."

"Right. Sit down over here and let's get down to business. You want to know, I presume, the state of production on the distorter contract."

"Correct," said Suu Brok. "We also want to take the delivery of the first hundred thousand units, if that will be satisfactory."

"We've had some labor difficulties that have slowed production somewhat. You are aware, of course, that the Venusians are the only ones capable of the delicate handwork involved in construction of the distorters. It is difficult always to get the anticipated amount of production out of the Venusians."

"But you promised!" Suu Brok expostulated. "And we've set the hour of striking. Less than eight Solar Days from now we attack the Martian base at Juufrong."

"Aren't you a little premature? Even a hundred thousand distorters would not warrant your striking that soon."

"We must! We've broken the Martian interstellar code and learned that *they* intend to strike at our Anterian outpost only two days later."

"Well, of course that's no affair of ours. We have the weapons to sell if you have the money. I'll guarantee completion of the order within three days."

"We can't wait that long!"

"You'll have to. I'm going personally to the Drian plant today to assist in settling the diffi-

culties among the workers. That will have to suffice."

The Jovians looked upon Jason Cartwright darkly. "It will suffice," said Suu Brok stiffly.

When the delegation had gone, Jason grinned broadly at the cat sitting on the desk. "Have to be careful when we're playing both ends against the middle, eh, Tom?"

He drew out a sheaf of papers from the filing cabinet. The Maltese cat looked down interestedly as Jason thumbed over the delivery records showing shipments of distorters to the Martians.

The Martians possessed just a few more than sixty thousand of the deadly weapons according to Jason's confidential papers. Therefore, that would be the limit on the Jovians' present allotment. The war would have to be kept as evenly balanced as possible for the maximum sale of materials to both sides. Jason had long watched the growing conflict between the two races and anticipated it as the means of obtaining System-wide commercial superiority. If he handled things right, he could make Cartwright Enterprises the richest company in the System.

He decided to take Old Tom with him on his trip to the Drian plant. As he left the landing area on the roof of the building in his private flier, the cat sat beside him placidly surveying the dank jungles that surrounded the city of Viamonde. The smoke of fires burning to smelt ore and to power cheap, old-fashioned steam machinery mingled with the natural fog to make the sky an almost impenetrable curtain through which they flew.

The Drian plant was located in one of the most inaccessible jungle areas of the whole planet, but it was in the heart of Venusian habitation. It covered a square mile of cleared jungle land, in which was manufactured the deadliest weapon of the Universe.

The distorter created a field at a predetermined distance which disturbed the natural molecular equilibrium of substances to such an extent that the entire structure shifted its internal relationship destroying machine functions and instantly killing all forms of life.

The Venusians, of course, had no knowledge of the function of the instrument. They knew only that they were being paid handsomely for something they did almost for pleasure. For it was a pleasure for them to use their agile fingers in the fabrication of delicate artifacts.

The native Venusians were delicate, almost pigmy creatures, seldom over three feet in height, and covered with a silky, water repellent fur.

For ages they had been subject to the disease they called Jungle Dread until they did not know it was a disease and thought it a natural condition. The evolutionary processes that built them failed even after long ages to provide an immunity to the disease. Only when a natural *immune*, a mutation, somehow appeared in their midst did they know that something better

was attainable. The *immunes* became leaders of their people, but their own immunity was not transmitted to their progeny.

So it was that when the first Earthmen came and discovered the nature of Jungle Dread, and provided a temporary relief from the enervating illness, that the Venusians experienced a vast renaissance. For many years they had been content with the things Earthmen offered. Now they were beginning to understand the ways of Earthmen upon Earth. They began to see glimpses of the light of civilization in their jungle darkness and they were reaching out for those things that they could see.

Many Earthmen knew it and saw it as inevitable that the Venusians could not much longer be exploited without raising their standards of living and granting them the fruits of civilization, but Jason Cartwright refused to believe it. His empire had been built upon imperialism and exploitation. To admit these were becoming old fashioned would admit the waning of his star.

On the invisible guide beam that led the ship through the fog and dimness, Jason sped towards his goal. Near the end of the journey he glimpsed the broad square that marked the great Drian plant in the jungle depths. The ship nosed down and settled gently upon the landing area at one edge.

Westerman, the plant manager, was waiting as the ship settled. Jason had called him in midflight to advise of his arrival.

Westerman was a good man. He believed in the inevitable righteousness of wealth and in the unquestionable right of Cartwright Enterprises to exploit as they were exploiting the Venusians.

He welcomed Jason with a handshake and a proffered cigar. The heavy diamonds on his ring finger were dulled with condensed moisture of the humid atmosphere.

"Come in, Jason," he said. "This is a surprise. I had no idea you were coming down, today."

Jason answered only when they were in the triple shielded office where no radiation could penetrate to reveal spoken words. The cat, Old Tom, followed the men and took up his place in the window where he could watch the fog shapes move soundlessly.

Jason said, "I didn't plan to come, but Reamond says things are getting out of hand with the Venusians down here. We've got to do something to get those distorters out. I promised the Jovians a hundred thousand units in three days."

Westerman's cigar dropped as his jaws slackened. "A hundred thousand! Man, you're crazy! We've only got fifty thousand ready for shipment now."

"I know. I don't intend to give them more than sixty, but we've got to let them have at least that many."

"We might be able to do that, but a hundred is ridiculous."

"Reamond thinks we've got to give in to the Venusians."

"No! That's stupid!" Westerman's face grew florid as his most fundamental principle of operation was suddenly thrown into question. "It would be commercial suicide to give in to them. They'll ask for more and more until they own the company. It's ridiculous."

"I think maybe Reamond's right, to some degree. We're wasting our energies and money and reducing our production by constantly fighting the Venusians. Even if we do give in to them an inch at a time we can keep them at a sufficiently low level of consumption that we'll still be ahead of the game in increased production. After all," Jason said expansively, "we're not a bunch of robbers and cutthroats. We're out to give a fair deal wherever it will be to our best interests."

"Save it for the publicity office," said Westerman sarcastically. "I'm against any retreat from our present position. We've established a reasonable rate of pay and living conditions for these . . . these savages—that's all they were before we came. We have no obligation to raise them to any cultural level above their own."

"I'm going to try it as an experiment anyway," said Jason. "Besides it will be one way of controlling the *immunes*. We'll grant increases only on condition that no *immunes* be employed."

"I'm against it," said Westerman.

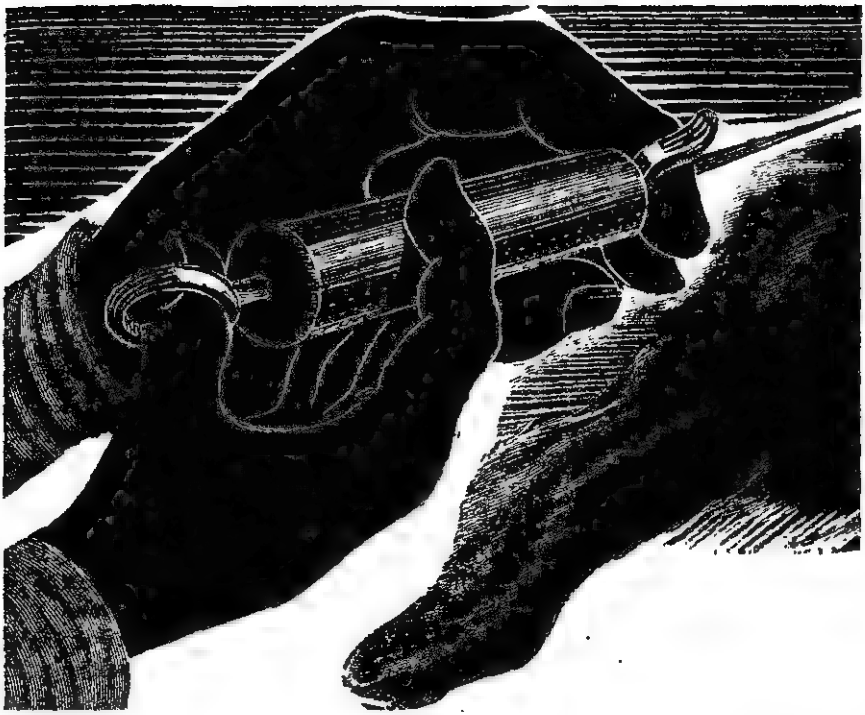
That afternoon an attention alarm sounded throughout the vast shops where thousands of intent Venusians bent over their work benches on the long assembly lines where the deadly weapons were being constructed.

Then there came the voice of Jason Cartwright, automatically being translated into the Venusian tongue as he spoke. He promised the Venusians that provision would be made for their own village near the plant, with civilized homes, warmed and lighted and provided with water and sewage, for these were the things that the Venusians had learned that Earthmen had. He promised them good food and clothing, for in dress they desired to imitate the Earthman. And he promised adequate antidote for Jungle Dread. The only provision was that no *immunes* were to be employed.

He allowed them an hour to come to a decision and at the end of that time offered to meet their delegates. He was much surprised when they came to the office twenty minutes later and accepted the full provisions of his plan with complete agreement on the prohibition against *immunes*.

Jason smiled confidently at Westerman as he prepared to leave. "You see? It takes only a little diplomacy and you can get anything out of these Venusians. I'll bet they'd turn out a hundred thousand units if you asked them to."

"And I'll guarantee your troubles aren't over yet," said Westerman. "Within a week there'll be new



ones. They've got something up their sleeves. You'll see."

Jason laughed heartily and called to Old Tom who leaped agilely into place within the ship. Within moments the ship disappeared into the fog.

At home that night, Jason considered that he'd done a good day's work. His success with the Venusians overcame somewhat the previous defeats that still rankled in his mind.

The big house was empty in spite of the score of servants in various parts ready to attend his slightest wish. It was Lotta who made that big house into something that approached a home. It was the quiet background of her presence that had provided Jason the small amount of mental peace that was present in his life.

He had sold out on that pretty cheaply, he thought. He still would like to know exactly how Lotta had found him out.

After the solitary dinner he wandered out into the spacious yards and called in the foggy darkness for Old Tom, but the cat failed to respond. He had the freedom of the yards at night and Jason gave up after a while. He went to bed early, anticipating a good day to follow.

He rose early the next morning

and found Old Tom already having breakfast of thick cream. Jason turned on the newscast coming direct from Earth as he began his own meal.

The newscast was interrupted almost before it started by a sudden call. Jason answered, and Westerman's frantic voice surged into the room.

"Jason! Something's leaked somewhere. The Venusians have got hold of the information that these instruments are distorters and weapons of war. They refuse to have anything to do with them because they are to be used in killing. This morning the whole plant is shut down!"

"How did they find that out? They aren't smart enough to figure it out for themselves. Take them off antidote!"

"I don't know how they found out. They simply say it came out of the jungle. Someone in the jungle told someone else, but they believe it. As for the antidote, that's a joke, Jason, and it's on you."

"What are you talking about? Explain yourself!"

"You made them agree that no *immunes* would work here. They're *all immunes*, every one of them. Punish them by sending them away and the whole plant closes. We're helpless to do anything about it and they knew it when you bargained with them."

Jason stared at him, trying to comprehend the incomprehensible. "That's impossible. There aren't that many *immunes*."

"Have it your way. But I'm telling you what happened. We diluted the day's antidote. Not a thing happened. They show no response. And they won't work. If you think you can get those sixty thousand units out of here in three days, you'd better come on down."

"No . . . no, we'll have to think of something. I'll call you later."

He sat down at the breakfast table again, his mind unable to concentrate on a single point. It skipped frantically about the growing pyramid of defeats he had experienced the past few days. First Lotta, then Bridgeman had escaped him. But those events were minor compared to this. *How had the Venusians learned of the function of the distorter?*

He forced the breakfast food into his stomach and turned up the newscast once more.

Halfway through his dish of Venusian colqua fruit he halted with spoon in midair. The newscast announcer was saying:

"The biggest news this morning is the revelation of the near outbreak of war between two major powers of the System, Mars and the Jovian Satellite Federation. The revelation came as evidence was presented to both sides showing incontrovertible proof that each was preparing attacks that would precipitate suicidal war, for each was about evenly matched with equipment in the form of the newly developed distorters, the frightful weapons, whose almost untold range and power of destruction would surely have decimated

both groups. The war, however, has been averted at least temporarily, with the decision to submit it to arbitration.

"The Council of Associated System Governments is making rapid moves to outlaw the distorter and destroy all facilities for its production, for it is the one weapon of war which has no legitimate use, therefore, there is no excuse for its continued production.

"It is rumored, incidentally, that there is only one people capable of such work as is required in distorter production. They are the Venusians, and swift control of the Venusian producers is expected.

"Actual copies of secret files are in existence as evidence that the great Cartwright Enterprises are responsible for the production of these deadly weapons. Their reports, as shown here, indicate the amount of production allotted to each side."

Jason Cartwright suddenly thought that he was going to faint. Dizziness and nausea assailed him as the speaker's face was replaced by a view of the papers indicated —papers from Jason's own secret files in his office!

Time seemed to have halted while slowly the realization filtered through his brain that his dream was utterly smashed. His dream of a vast commercial empire to be washed up on his shores by the turbulence of war on other worlds was shattered. And even more than that, the position of the entire Cartwright Enterprises would be destroyed in the flood of public opinion that would be turned against it as the result of this revelation.

He sat down in his chair again without having realized he had risen to press his face against the visor screen when it showed his own secret documents.

Defeat—defeat so monumental it was destroying all he had fought and lived for—shook him as if with ague.

Slowly his mind resumed functioning. How had those pictures of his records been obtained? The office was guarded like a mint. There was not a comprehensible chance of any unwanted visitor breaking in. It was scientifically impossible for spy equipment to have been installed. Yet there it was, proof that someone had obtained those records.

His mind fought with the turbulent question. It went back to the other recent instances when it seemed that secret information known only to him had leaked. The revelation of his deception to his wife, the tipping off of Bridgeman, even Dr. Wallace's knowledge of Jason's secret drinking, the revelation of the purpose of their product to the Venusians at Drian, the whole exposure of the war plans between Jupiter and Mars.

Every one of those instances involved secrets known to him and they had leaked. Fantastically and impossibly leaked.

Had he somehow been subjected to drugs or hypnotism and made to reveal them? That would mean

that there was a traitor in his own organization. Reamond, perhaps?

Yet there was another, more remote possibility that gnawed at the base of his mind. His brother, Robert, was his bitterest sworn enemy. Was it somehow possible that Robert was responsible for this? His men had reported that Robert had set up a jungle laboratory not far from the city, in fact it was less than five miles from Jason's mansion, but there was nothing suspicious going on there. Robert seemed to be engaged in some kind of research having to do with jungle flora and fauna. He never ventured out of the jungle any more. He seemed perfectly harmless there with his three Venusian servants who apparently worked for nothing, since he had nothing with which to pay them.

But Jason still could not rid his mind of the image of Robert as he stood in the office that last day. Robert had been so sure of himself as he had uttered his crazy threats: *"I'll never allow you to interfere with my work. You said the cat was symbolic and you're right. Old Tom may be in your possession, but I am still his master."*

The words rang in Jason's ears. Robert seemed to have taken a new symbolism in possession of Old Tom that didn't make sense to Jason.

The pictures of his secret files as shown on the news screen came back to his mind. Then suddenly Jason's face went livid and twisted crazily. He reached for the cat as it finished the last of its cream and hurled it madly across the room. It screamed wildly and crashed into thick draperies hanging from the opposite wall, which is all that saved its life.

It clung frantically for a moment, then leaped to the floor with a fighting snarl and arched back.

"So you're symbolic!" snarled Jason. "What a mortal fool I was to miss your symbolism! If you can hear me now, Robert, know that I'm coming after you. This robot of yours has given itself away. Those pictures of my secret records were on my desk and it was my hand holding them, and the viewpoint was that of the cat as he sat on my desk that day. I'm coming for you, Robert, but I'm going to bring the remains of your robot with me."

And then Jason knew that he was acting s t u p i d l y. Robert couldn't have been listening. The robot couldn't contain a radio transmitter. That would be futile in view of the screens and shields that protected Jason's home and office. The information was divulged in some other manner. Yet how? He calmed. His suspicions were fantastic. Yet there was no other possible means by which he had been betrayed. Somehow the cat had done it.

Jason turned to the cat again as it cowered lifelike in the corner. He had to admire the workmanship that had produced such a thing. Robert was clever, more clever than he had thought. Clever enough to finally wreck the great Cartwright

empire. But he would pay for it.

Jason slowly drew a cover from a nearby table. As he approached, the cat leaped at him like a wild thing and he caught it in the cover, swiftly wrapping it to prevent its escape. And for a moment he suddenly despaired of his answer to the problem. Surely the cat couldn't be a robot. It was too lifelike in its snarling, clawing struggles. But there was one way to find out.

With the thing in a sack, Jason took it to the laboratories in his office building. He handed it to the X-ray machine operator. "I want pictures of this cat. Put it in a pressure vault, however, because it may explode. Leave it in the sack! It's wild."

The bewildered operator did as he was told. But Jason's fears were not realized. The cat didn't explode. And the pictures told a story. Not all of it, but enough.

He called Reamond. The private patrol leader's face was incredulous as Jason unfolded the story. He was torn between a rat's desire to leave the sinking ship, and the knowledge that Jason still had too great a hold on him for that. He said, "What do you want?"

Jason said, "Get a pair of your best men and some weapons. We're going in after that rat if it's the last thing we do."

"Don't you think he'll be expecting us?"

"No. He can't know that I've discovered the nature of his cat. We'll even let the thing lead us to him, because he must have some way of knowing when it's coming."

They waited until dark, and it was the longest day of Jason's life. He avoided the newscasts, and stayed away from the offices. The Council would come for him soon enough. He rehearsed the things he would say to Robert, the tortures he would put him to before he killed him.

Then, at last, things were ready. Reamond came to the mansion shortly after dusk with his three picked gunmen, Riley, Wilson and Stacy. Jason didn't like the appearance of any of them from a subjective point of view, but they looked competent in their trade.

"We're ready," said Reamond.

Jason took the sack in which the cat had been imprisoned all day and then went out into the thick darkness beyond the boundaries of the mansion. Jason fastened a collar and long wire to the cat, then let him go. The cat leaped away until he was brought up by the restraining wire. He fought it madly and Jason sloshed rapidly through the wet jungle to follow.

"We ought to be more careful," said Riley. "This don't look like a good setup to me."

"He won't be expecting us," said Jason. "He'll only be looking for the cat. It goes to him every night that it can get free and comes back in the morning."

The trio of gunmen were silent, but their dislike of following a wild cat through the wet jungle night

was obvious. The night sounds and the constant drip of water from foliage above them set their nerves on edge. And Jason's careless crashing through the jungle produced a constant fear in them that hordes of unseen enemies would be firing at them momentarily.

When they had covered four of the estimated five miles, Wilson's nerves were near hysteria. He suddenly stopped and exclaimed, "You guys are crazy if you go any farther. We don't know where we're going and we'll all end up by getting killed. I'm going back whether you guys are or not."

The only answer was a sudden shot from Jason's gun and the flash of a burning ray that lit the night long enough to see the crumpled body of Wilson lying in the jungle muck.

"This is important," said Jason evenly. "We're going to get Robert."

Silence marked assent as he deliberately turned his back on the others and continued on the way. He knew the breed from which the gunmen sprang. They wouldn't have the nerve to shoot him in the back and retreat.

He would not have been so sure if he could have read the mind of Reamon. The private policeman's finger tensed on the release of his gun, but something within him kept him from killing Jason. Through the dark hours he had fought it, but in vain. He knew that he was about to see the close of an age in man's history, and surely it deserved some better ending than a traitorous shot in the back.

Jason was through. He was a dead man and didn't know it, but Reamond wanted to see the fight he would make for survival. He wanted to see Jason's face when he realized the fact that imperialism was dead, and that Jason, the last of the great imperialists, was dead with it.

Undoubtedly he was risking his own neck, but he had to see the end of the Age of Imperialism in this phase of history. Reamond lowered his gun.

They had gone nearly another mile without seeing anything when Stacy uttered a warning. "Hold it. I think there's something ahead of us there."

The party halted. "I don't see anything," said Reamond.

"Come on. We're almost there," said Jason. The cat was pulling frantically now as it lunged to escape.

At that moment a torrent of Venusians burst from the trees on their left. The party froze in immobility.

"Can you get any of that stuff?" Jason demanded of Reamond.

"Yes, I understand it well. They want us to lay down our arms and come with them."

"Tell them to go back and tell Robert we're coming for him. They must be some of his lookouts."

Reamond spoke. Then from the jungle depths came the answering flame of a modern tube gun. The

men flattened themselves on the padding of grasses and leaves overlaying the muck.

"What did you tell them?" demanded Jason.

"I asked what would happen if we refused."

Jason swore and cursed. "I'll show the dirty—" Before the others could stop him he sent a stream of fire into the darkness.

Instantly, it was answered. And a piercing scream burst from Jason's lips. In the white light of the flames, they saw him crumple and crash to the path at their feet.

Reamond stared numbly into the darkness. He might have known that Jason would lose all sense of craftiness. That was the way of a man like Jason when he was trapped. He tried to win with the blind arrogance that had brought him to his knees. But you couldn't load a tube gun with arrogance. Reamond had risked his neck to see a turn in the history of the universe. And this was it. A man lying mortally wounded in the jungle muck of Venus.

Reamond called out. There was silence for a moment, then diminutive forms came forward cautiously and pushed aside the thick growth.

"Take us to your master," Reamond said in a voice thin with resignation.

Silently, the Venusians picked up the groaning, struggling form of Jason and carried him skillfully through the jungle. It was only a matter of minutes until they broke out into a small clearing and came in sight of a lighted hut. The Venusians continued forward and entered after a warning knock.

The Earthmen found themselves entering directly into a small but efficient-looking laboratory. A slim, middle-aged man with glasses and laboratory smock was present, but he paid no attention to them. He was bending over an object strapped to a table.

Then he moved and straightened and a shining instrument was in his hand.

Jason saw him through pain-glazed eyes. "So I was right, Robert. It was you who betrayed me—you and your robot cat."

"Betrayed, Jason? I would hardly call it that. Salvation—for a whole world—would be better. But robot, did you say?" The scientist laughed suddenly. "I'm afraid Old Tom resents that."

The cat had risen now as Robert Cartwright released the straps. Its back arched at the sight of Jason's face. He snarled and clawed the air. "You must have mistreated Old Tom. He doesn't like you."

Jason's eyes grew wilder. "You mean he isn't a robot? Then, how— No! Robert, I'll never believe you tricked me into coming here with merely a live cat. My office was spied upon, my secret papers . . . and the Xrays—"

"Yes, Old Tom did it all right," said Robert. "But he's still no robot. He's alive. I knew a long time ago that I would have to be the one to destroy you, Jason. I knew that all it would require would be an exposure of your own

life. That would speak for itself and spell ruin for you. But the question was how to spy upon you.

"I found the answer in our boyhood pet. As you say, the cat is symbolic. Symbolic of the life you chose—symbolic, too, of the life I chose. The cat symbolizes all that you ever took from your fellow men by trickery and lies. And it symbolizes that the science that I chose shall in the end triumph over all your lies and schemes, for it has brought your downfall."

"How did you do it?"

"It wasn't simple, but the Venusians figured it out after I showed them what I wanted. The useless parts of the cat's brain were removed as were other nonessential organs or portions of organs. In their place were built tiny masterpieces of electronic equipment. To the cat's optic nerves were connected visual recorders, to his ears, audio instruments. And all that he saw and heard was impressed upon infinitesimal records. See, I have just removed one. It is taken out just below his ribs on the right side with a large size hypodermic needle, and a new record inserted in its place. The operation is practically painless to Old Tom. The only other thing needed was a means of guiding him here by radio control when he was safely out of the field of your screens. It was easy to direct him here by inciting a small amount of pain or discomfort in certain nerves when he moved in any direction but the one required to bring him here. The records I obtained were distributed where they would do the most good. They saved Bridgeman and Lotta. Wallace's warning helped add to your unnerving.

"You were done for long ago, Jason," Robert continued. "You're an anachronism that somehow managed to live on beyond your time. You are like the last dinosaur must have been, bellowing and thrashing its way about a world that had no need of it. You are the last of the great imperialists. It would not have been worth while to combat you except that you were impeding progress and causing death and misery to millions of Venusians, not to mention what you were doing to the Jovians and Martians by inciting them to war.

"You thought that you blocked the Venusians when you prevented my serum from reaching them. You see how they have solved the problem for themselves. I didn't even know they had done it. They are outstripping Earthmen fast. Eventually, when they catch up on their lost evolution, they may surpass us by far.

"But, as for you, the police will want to know all about your manufacture of distorters. And so the great Cartwright Enterprises are finished. You're finished, Jason, and another age of imperialism has come to an end."

Suddenly, the cat broke away from Robert's hold, and leaped to where Jason lay. But Jason made no move. He was dead.

THE END.

RADAR - EYE VIEW

Radar: The Waves That "Feel"

by L. JEROME STANTON

In a sense, radar is an extended form of vision, in some ways it's a mechanical version of E. E. Smith's "Sense of Perception." But perhaps it's most like a sense of touch so delicate it can feel an object two hundred miles away.

Among a bewildering array of wartime discoveries now emerging from the veil of military secrecy, radar remains well up on the scale of public interest. Easily the most versatile and adaptable of the super-gadgets spawned in the laboratories under the stimulus of vital urgency, radar's seeing waves seem destined to maintain their position in the advancing years of peace. The very adaptability which made radar such a jack-of-all-trades in military operations suggests immediately numerous commercial and industrial uses which bid fair to revolutionize many aspects of the life of John Q. Citizen, especially in certain indirect but fundamental ways. This being the case, let's take a good, close look at radar's past exploits and future possibilities.

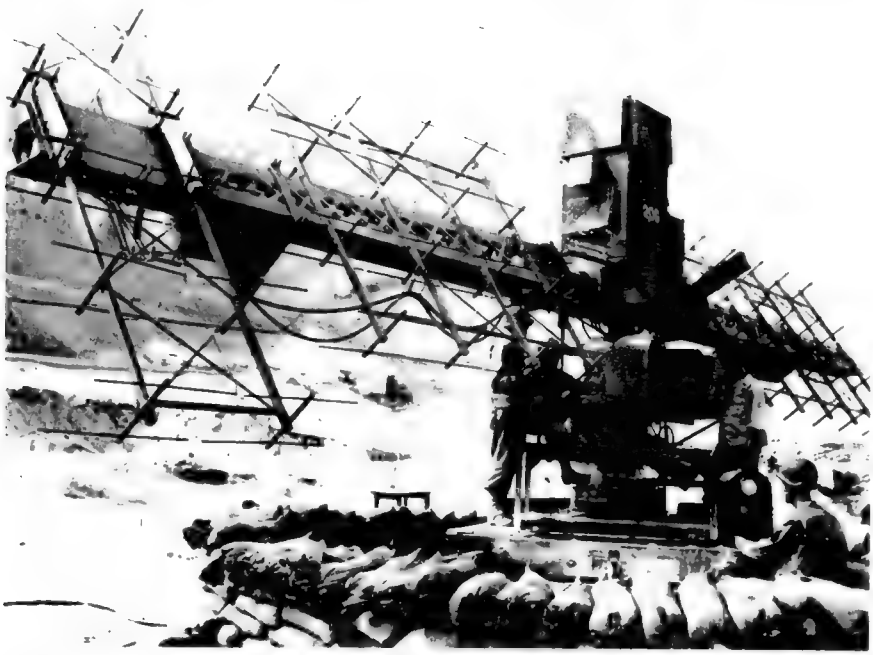
DDT killed bugs, and atomic bombs killed our less admirable enemies in satisfyingly large numbers, but neither of these products of man's effort and imagination seems immediately adaptable to more varied functions like landing aircraft safely on zeroed-in airstrips, or bringing ships into port unscathed through blinding fog and heavy harbor traffic.

Too late to get into the war against Japan, extremely high-definition micro-wave radar was developed. A photograph of the PPI scope of a B-17 flying over the New York City area—the plane was directly above the center dot—reveals astonishing detail. The individual docks, major buildings, and bridges can be spotted readily. The Hudson and Hackensack Rivers are clearly visible, as well as Central Park and the East River.

Courtesy: Radiation Laboratory M.I.T.

Radar can and will do these and a host of other services for us, and it is now in the process of conversion from killing to saving, but to understand just how it can accomplish these less sanguine results successfully it may be well to take a quick glance at what radar is, and the "how" of its seeing waves. Also, it may be well to clear up some of the confusion engendered by hasty and inaccurate accounts which have appeared in print.

Radar is primarily a radio-electronic device which can detect and identify material objects at considerable distances—as much as three or four hundred miles under favorable conditions—and measure their distance and direction, and the direction and speed of their motion by day or night, in almost any kind of weather. It does all this by transmitting a very short but very powerful burst of extremely short radio waves in a narrow beam, picking up the very small part of this burst or pulse of radio energy which is reflected back from the target, and measuring the time interval the pulse required for the round trip to the target and return. Since the speed of radio waves is 328.1 yards per



Courtesy: Signal Corps—U. S. Army

One of the earliest types of radar, using relatively long waves, this equipment was the standby of the Army in North Africa. Now obsolete, the equipment can be bought as surplus for a few hundred dollars—if you can find a use for it.

millionth of a second—roughly 186,000 miles per second—we have a good measure of the distance of the target, if we measure the time interval accurately. Radar also can determine the direction of the target, since the beam is focused in much the same way as the rays of a searchlight.

This basic echo principle of radar is, like most fundamental things, very simple; as simple as a Swiss yodeler bouncing echoes of his voice off the cliffs of his native Alps. This is exactly the phenomenon that makes radar work, although the yodeler does it with sound waves instead of radio waves. But man is far from being the first living creature to make use of the echo phenomenon for purposes of his own. To trace the origin of this use we must go back some millions of years to the first bat that flitted its way about an unlit cavern.

For all we know the modern bat may smile tolerantly at the exploits of his primeval ancestor as we do at the fumbling advance of ours, but in one respect he has made little improvement, probably because little was needed. Today's bat, not yet jet propelled, still guides his apparently erratic flight among the gloomy confines of caves and belfries by emitting a series of short, very high-pitched squeaks and listening to the echoes, even as did his primordial predecessor.

Unfortunately for humans bent on discovering a way to detect the approach of objects inimical to their health and comfort, like a *Kamikaze* plane, say, or a submarine periscope, the bat squeaks away at a pitch far above the range of human hearing. A healthy youngster of nineteen can hear sounds vibrating as rapidly as 20,000 times per second, but even this is not a wide enough range of perception to detect the bat's built-in, echo-ranging squeak, which vibrates somewhere between 45,000 and 60,000 times per second. For this reason man never stumbled on the secret of the bat's uncanny ability to locate and avoid obstacles in the dark until long after he was himself building electro-mechanical gadgets for the same purpose.

Even if we had discovered the bat's orientation method earlier, we could not have employed the same kind of vibrations for locating the approaching flight of bombers—or the passenger flight lost in low clouds. Ordinary sound waves die out rapidly with increasing distance, and travel so slowly that to get an echo back from a plane even one mile away would require about nine and a half seconds, ample time for the plane to arrive within striking distance.

Something is required that travels at very much higher velocity than a sound wave, and which pays little attention to things like darkness, clouds, rain, dust, or a few miles of distance. That means radio waves, very much like those which waft Fibber Magee or the denizens of Allen's Alley into millions of homes, and to utilize these waves requires the science of man well applied.

Courtesy Radiation Laboratory M.I.T.

This captured German "Wurzburg" radar antenna system is obsolete also—it was obsolete before the war ended, thanks to Allied radar countermeasures. The Germans had billions of dollars invested in this type of equipment, and the effectiveness of countermeasures ruined their investment—and, thereby, Germany.

Radio amateurs, scientists and communication engineers have long known that radio waves bounced off many objects in the form of a radio echo, just as the yodeler's voice bounced among the crags of his native Alp. The very earliest experiments performed by Heinrich Hertz in 1887 to demonstrate the physical truth of Clark Maxwell's equations involved bouncing radio waves by means of reflectors, which concentrated them into beams. Hertz found it necessary to concentrate the radiation he produced in one direction, in order to show conclusively that it traveled through space and could be detected at a distance. His receiving device was crude and insensitive in any case, but he did demonstrate the basic principle of radar and radio transmission.

But as is usually the case, making practical use of the principle was a matter of another order of difficulty entirely. The basic problems to be solved in producing a practical radar apparatus are these:

1. A transmitter capable of generating and radiating very short radio waves strong enough to return a detectable echo from a distant object must be devised.

2. A means for switching the transmitter "on" for very short periods and then "off" again must be provided, in order that outgoing pulse will not interfere with reception of the returning echo.

3. A receiver capable of picking up the relatively feeble radio waves reflected from the target, and amplifying them sufficiently for perception must be devised.

4. A system for measuring accurately very small intervals of time is required.

5. Means of determining the direction from which the echo is received is needed.

6. All the information obtained should be displayed visually for maximum clarity and usability.

7. The equipment which accomplishes all these things must be rugged enough for field service under battle conditions in all climates, and simple enough to permit operation and maintenance by personnel with no more than high school education on the average, plus a reasonable amount of specialized training.

Any one of these requirements would be severe enough to occupy a large staff of engineers for many months ordinarily, but taken together they represent a very formidable hurdle indeed. Nevertheless, the obstacles were rapidly surmounted, in one of the supreme examples of intensive and concentrated intellectual effort in human history. How these basic problems and additional ones arising from special conditions such as enemy counter-measures were solved makes a fascinating story, especially in view of the urgency attending the work. To understand this story, let's take a quick glance at the whole history of radar development.

Hertz's early experiments had demonstrated conclusively the reflec-

tion of radio waves, but his work remained for the most part buried in scientific literature, and the idea of utilizing the reflected wave as a means of detecting objects at a distance had to wait until 1922, when physicists Albert Taylor and Leo Young of the Navy noticed that shipping in the Potomac had an effect on short-wave signals they were transmitting across the river.

The idea that this effect could be used to reveal the presence of ships at a distance was born, but was not fully investigated in the years following, due to the strong sentiment for disarmament, and the consequent difficulty in conducting research in a Naval establishment already undermanned and underbudgeted.

But by 1933 the political scene in Europe was changing for the worse. Fascism and Naziism, like twin noisome growths from the same root, were coming to power, and in both Britain and America the lights began to burn late in the laboratories. By 1935 England, spurred by the mounting menace on the mainland, had advanced so far as to authorize the construction of a chain of five radar —then called radio location—stations on the North Sea coast. When Chamberlain and his umbrella made their historic Munich trip in 1938, British engineers were quietly adding some fifteen more stations to their net.

In Germany also, research and development had been going on since about 1935, although this was not disclosed until the scientists of a beaten Germany were undergoing Allied interrogation. The French, too, had been experimenting, and tried a primitive radar apparatus as an iceberg detector on the *Normandie* as far back as 1936. Japanese developments were comparatively unimportant, although famed physicist Hidetsugu Yagi had been working on basic short-wave study long before the outbreak of the "incident" in China.

Meanwhile developments in the United States had moved ahead, although not at the urgent pace maintained in Britain. By 1940 both the Army and Navy had constructed a few bulky equipment capable of locating large objects such as ships at distances up to ten or fifteen miles. These were still experimental, but did show promise of practical designs to come.

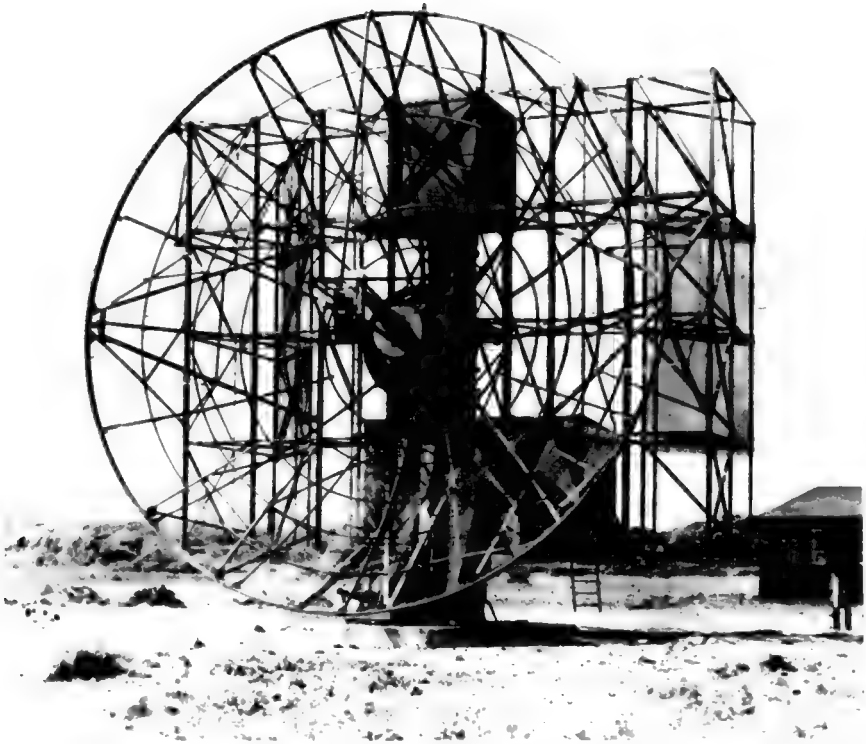
In all military operations, knowledge of what the enemy is doing is among the most aching needs of strategic and tactical commanders alike. His strength, disposition and movements are primary concerns, and no effort is spared in searching out these things, as well as his state of mind and present and future intentions. Direct and photographic reconnaissance by land, sea, and air are supplemented by espionage and underground activities, but all these methods have their limitations. These weaknesses are especially painful when the time element becomes urgent, as it does in any tactical operation. It doesn't do any good if your spies in the

One of the best of the German ground radars, the Giant Wurzburg captured by the British near Caen. The larger the reflector system of a radar antenna, the more precise the beam, and hence the indications on the scope. The shorter the wave length used, the more precise the beam may be made with a given size reflector.

enemy territory observe squadrons of bombers taking off, if hours or days are required to transmit the information. By the time it arrives, its destination may have become a muddy bomb crater by action of the bombers concerned. This consideration adds little to the gaiety of military commanders, or to the calmness of their sleep. The negligible time lag in information obtained by radar appeals very strongly to military minds—unless they have become so convinced of their invincibility as to hold the enemy in contempt.

Thus, long before the shooting started, the British, partly realizing their weakness in the field, cast about for a way to equalize this disadvantage. Early and accurate information of the enemy's activities would permit a smaller strength to be concentrated in the right place at the right time, with a better chance of successful action. Accordingly, upper bracket research men like Sir Robert Watson-Watt were turned loose on the problem, and British radar advanced rapidly. Soon after the outbreak of actual hostilities, the overwhelming strength of the Nazi striking force became apparent. The Wermacht overran Europe with almost terrifying speed, leaving Britain without allies near at hand, almost stripped of heavy equipment by the tragedy at Dunkirk, and generally open to assault. But when the Luftwaffe began the initial softening attacks on the British Isles, the German pilots found themselves intercepted and turned back by a numerically inferior air force which nevertheless always seemed to be in the right place at the right time, and shooting like mad. Thanks to Britain's lead in radar development, and Nazi overconfidence based on their immediate success, the Royal Air Force was able to humble Goering's proud Luftwaffe consistently, with an average of not more than three hundred operational fighter pilots, aided by information supplied them before take-off by the net of radar stations.

Too late, the German High Command partially realized its mistake, and gave some priority to research into ways of counteracting the British advantage. So began a struggle for supremacy of the radar wave lengths, a struggle none the less deadly because it was fought out in heavily guarded and secured laboratories, by men whose weapons were slide rules, soldering irons, engineering handbooks and naked intelligence. In 1940 the British and American researches became fully co-ordinated, and remained so throughout the war. In the United States the Army and Navy experts teamed with scientists and engineers of the industrial laboratories and communications and radio manufacturing companies in a colossal two-pronged struggle for discovery and large-scale production. Earlier investigators like the Navy's Taylor and Young found their researches coordinating with those of the Army Signal Corps' General—then



Courtesy: British Information Services

This British-made radar antenna, strongly resembling the Giant Wurzburg, indicates how two separated groups of engineers will inevitably reach similar conclusions.

Colonel — Roger Colton, under whose direction the first Army set was designed at Fort Monmouth. The Varian brothers at Stanford University, designers of the important Klystron tube, and scores more of the country's foremost researchers formed a great, almost anonymous army scattered from M. I. T.'s Radiation Laboratory to the California coast. A joint British-American committee flying almost regularly between the two countries co-ordinated the work, which was soon recognized as a race with German scientists for technical supremacy of the ether waves. Almost from the start one specific development provided an edge for the Allies which the Germans tried desperately to overcome. This was a high-power radar transmitting tube known as the cavity magnetron, and its history reads much like a Sunday supplement spy thriller.

One of the real obstacles to

development of a practical radar system is the difficulty of generating high-power radio waves at the extremely short wave lengths which permit really efficient operation. The echo returned from the "target" must produce an indication in the receiver somewhere near as strong as the thermal noise level at the receiver input in order to be perceivable, just as a broadcast station must sound at least nearly as strong as natural static to be intelligible. Since the amount of energy reflected to the receiver is a very small fraction of the total amount striking the target, and the total amount striking the target is in turn only a small part of the whole power transmitted, it is necessary to send out a really terrific surge of energy to produce a distinguishable echo signal. In some radars developed near the end of the war this power amounted to the fantastic total of 4 *million* watts, about 80 times the power of a full size "clear channel" network broadcasting station. Even though this power is transmitted in separate short pulses lasting only from 0.1 to 5 millionths of a second, the problem of making vacuum tubes capable of this stupendous output seemed well nigh insoluble, until British scientists developed the cavity magnetron tube in 1940.

The principle of the magnetron is well known to engineers, but this special adaptation proved to be such a revolutionary improvement on previous designs that it may well be credited with putting and keeping the United Nations ahead in the battle for radar supremacy. In the fall of 1940 a British engineer carrying a small black bag in the best tradition of the spy fiction writers debarked from a ship in New York, and was met by a Bell Telephone Laboratory engineer. Together they slipped into a theater to throw off possible pursuit, and later went on to the Bell man's home in a New York suburb. At the Laboratories the following day the ultra-secret magnetron tube was carefully unpacked, together with blueprints and specifications, and was soon yielding its vital information to American radar specialists. Many thousands of man-hours later, adaptations and improvements on its design were permitting United States and British radar engineers to design practical radar sets operating at such short wave lengths that whole new fields of possible application were opened up.

Meantime the German radar people had not been idle. They, too, were trying magnetrons of various types in their transmitters, but had little success in producing high power at the very short wave lengths of ten centimeters and less. As a result, they apparently decided early in the race that use of shorter wave lengths—higher frequencies—than could be produced by the regular magnetron was not feasible, and concentrated instead on the longer wave radars. This mistake, which subsequent interrogation indicated came about at least partly because of bad general co-ordination of the research

program, and lack of emphasis by the military authorities, was to cost the Nazis dearly in the months to come. The reason for this is soon clear when the advantages of employing shorter wave lengths are considered. In general, the shorter the wave length employed, the smaller and lighter the whole apparatus can be for a given standard of performance. This applies to almost all of the component parts of a radar, but most directly to the antenna which radiates the beam of energy and picks up the returning echo. At the extremely short—micro—wave lengths, a parabolic reflector as little as eighteen inches in diameter can radiate a more concentrated and efficient beam of energy than the huge arrays of stacked di-pole antennas used for the longer wave lengths early in the war. These ungainly "bedspring" affairs were one of the chief obstacles to the development of practical air-borne radar equipments.

Also, the micro wave lengths gave greatly increased resolving power in observation, which meant far more accurate identification of the number, size and character of targets illuminated by the beam. Perhaps the most important tactical advance produced by this greater resolution was the ability to "see" a target as small as a mortar shell, or a submarine periscope at short ranges. A surfaced sub showed up at eight or ten miles even on early sets of the micro-wave type, and later designs, extended the range to twenty-five or thirty miles as the Nazi U-boat commanders were to learn, the hard way.

With the basic development—sufficient power at micro-wave frequencies—in their grasp, Allied engineers turned their attention to applying their new tool operationally, working with Army and Navy experts, sometimes practically in the front lines. The result was a steady and widening stream of specialized radar applications, a mere listing of which occupies a respectable space in the reports of the National Defense Research Committee. We cannot mention or describe them all here, but a few of the more important ones can be touched upon.

The first radar was developed primarily to give warning of enemy approach, and even the early and crude apparatus operating at wave lengths of a meter or more did this job with fair efficiency. The first tactical use of radar by the United States occurred fifty-three minutes before the Jap attack on Pearl Harbor, when Lieutenant—then Private—Joseph L. Lockhard was practicing with a Westinghouse radar unit. Lockhard detected a swarm of aircraft 132 miles from Pearl Harbor at 7:02 a. m., and reported their location, speed and direction of flight to his superior at 7:20 a. m. His report was disregarded as the planes were considered to be a flight of Flying Fortresses arriving from San Francisco. At 7:55 the Japanese planes were over Oahu.

Courtesy: Signal Corps—U. S. Army

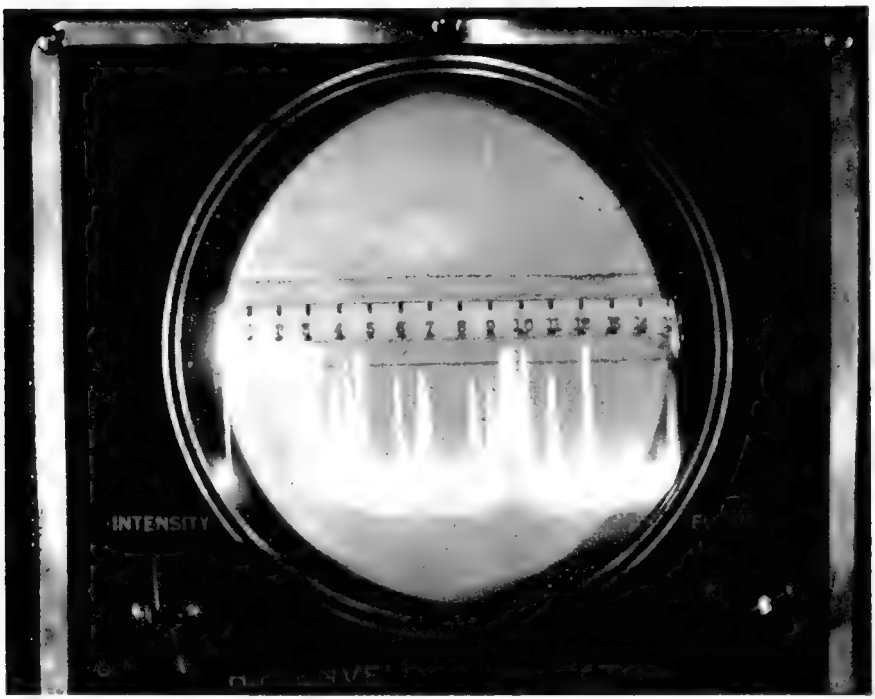
This American radar system appears to resemble the small Wurzburg; actually, by using much higher frequencies, and shorter wave lengths, the small reflectors have been made far more effective. The Allied radar technicians far outstripped the Germans in the development of micro-wave techniques.

The way in which the British coastal early warning radars helped to smash the Luftwaffe has already been described. When the Nazi squadrons shifted to terror attacks by night, British night fighters were still able to make interceptions by following instructions relayed from the radar plotting rooms through their own bases by radiotelephone. Later this entire technique was vastly improved, and under the name of GCI—Ground Control of Interception—became a terror to the marauder attempting a sneak approach during dark hours.

GCI was one of the more important defensive radar techniques, and with the advent of high-powered micro-wave radars for early warning and small sets capable of being carried in a night fighter—called Airborne Interception radars—became the principal means of combatting night air attacks, both in the European and Pacific war theaters.

Of all the radar sets developed

during the war, perhaps none is of more importance and interest than the micro-wave early warning—MEW—equipment which first saw active service early in 1944. This radar is a huge affair with a total weight of around sixty-six tons, which was originally planned to give the maximum coverage and information possible from a given location. Needless to say, it required a good, safe site, and strong local defenses to make its employment practicable. MEW's great size and weight also demanded an operating and maintenance staff of about one hundred fifty men, but in spite of these requirements speedily became a real mainstay in the Allied arsenal. Strangely enough, this was partly because it was immediately used for almost every conceivable purpose except the one for which it had been designed, that of early warning of enemy approaches. This came about because of the fundamental nature of this equipment, which was really two large radars in one, each of such power and flexibility



Courtesy: Radiation Laboratory M.I.T

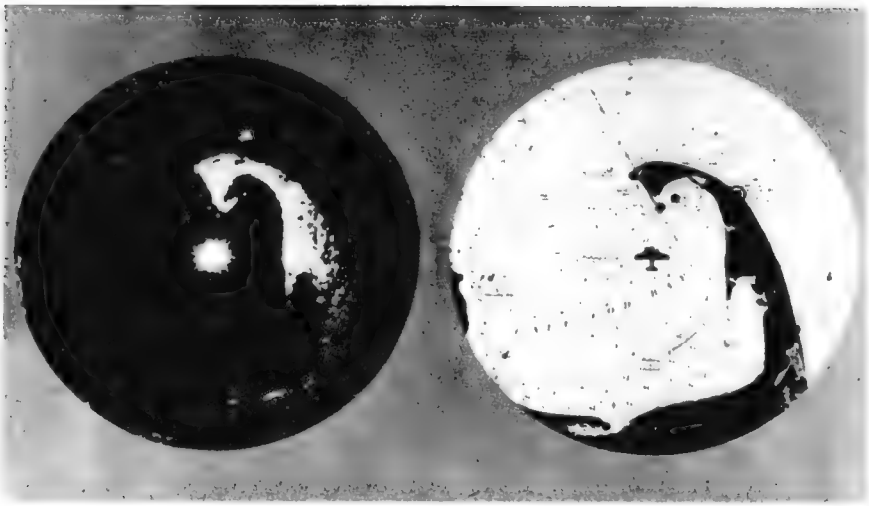
A radar 'scope shows a series of pips indicating reflections from objects at several different distances. This type of presentation of the radar data makes it easy to read the distance to a particular target—but doesn't give the over-all picture of the situation.

that any "target" of distinguishable size could be perceived at the extreme limit of a radar's range capability.

Except under special circumstances no radar can see targets at distances more than a fraction greater than they can be seen visually, which is one of the reasons radars are mounted on towers or the tops of hills and headlands. Even from a good site, radars using less power than MEW were unable to consistently detect small targets at their extreme theoretical range. With the advent of MEW, whose twin beams gave both high- and low-angle coverage, this picture was quickly changed. A heavy bomber at 30,000 feet was readily detectable at 200 miles, and the great flexibility of the equipment permitted carrying on several functions at once without mutual confusion. As an example, MEW could track accurately almost any number of enemy radars at once, direct fighter planes to intercept them, control other groups of fighters and bombers as air cover for ground forces, track storm clouds in the area, and at the same time remain alert for any additional targets which may appear, all with a high degree of accuracy in direction and range, and with the addition of a smaller height finder, in altitude as well.

Radar data is almost always presented to the operators as fine bright lines or patterns on the face of a cathode-ray oscilliscope tube very much like those used in television receivers. These "scopes" as they are called are of various types, and have scales to show the distance and direction of targets in view, and sometimes also the altitude. Since the whole area around a radar site can be scanned once a minute or oftener, even when searching, the unit also shows speed and direction of movement of targets. MEW installations may have as many as eighteen scopes to show data for various purposes, with skilled operators to man them and interpret the patterns shown.

It was this extreme versatility that expanded MEW from the function of an early-warning device to an overall observation and control center of vast capabilities. The first service unit arrived in Britain January 28th, and was fully operational within eight weeks. Its capabilities were well demonstrated during the testing period on March 20th. Fourteen B-17 bombers returning from a raid badly shot up and limping, were lost over the Atlantic in bad visibility. With gas low and orientation uncertain, the flight leader decided to ditch, but made one more try to obtain his position by radio from shore-direction finders as an aid to rescue ships. Meantime the MEW operation crew training with their newly set up equipment picked up the flight as a group of dots at 170 miles distance and, thinking it hostile, reported it to the chief controller. A shore direction finder station heard the distress call on a radio channel in use by the 8th Air Force, and also reported, giving the direc-



At upper left is a photograph of a radar PPI scope—plan position indicator. Upper right is a map of the Cape Cod region, with a plane indicating the position of the plane which carried the PPI scope. The lower photograph shows the visual scene from the plane at that point. The light dotted circle in the PPI shot is a range-marker circle; the PPI presentation of radar data gives an excellent over-all picture of the situation—but is not very useful for giving accurate ranges. Both PPI and the pip-type presentation are usually given by a radar installation.

tion. This checked with the position shown by MEW, and the chief controller immediately became very busy.

The MEW installation was not yet completely equipped for communication on 8th Air Force radio channels, so the plotted position was phoned to a nearby interception station which was. Quick talks with the B-17 leader instructed him not to ditch, but to make it in as close as possible. Meantime air/sea rescue planes were put in the air and headed toward the cripples. The MEW operators were able to continuously track the entire operation, and continued to phone plots at regular intervals.

Meantime the going became tougher for the Forts. More engines gave up, two were burning on one ship, and wounded crews had desperate struggles keeping the ships airborne. But they all kept on, and on a fog-wrapped coastal headland the MEW kept them headed in the right direction until a shorter range station was able to take over direct control. Thus guided, the flight finally set down on a coastal airstrip without the loss of a single ship, and the cold Atlantic was cheated of $2,500,000 worth of aircraft and 140 human lives.

A part of MEW's astonishing ability is due to the very short wave length employed, which permits a very sharp edged beam to be radiated, like an accurately focused searchlight. Because of this it is possible to sweep the beam very near the ground or sea surface without serious interference by echoes from surface features, and thus it is much easier to pick up low-flying aircraft attempting to approach undetected. Also, the shorter wave length gives much higher resolving power, permitting the operator to distinguish between objects very near each other. This higher resolving power for shorter wave lengths is an inherent property of all radiation, including light and sound waves, and arises from the fact that objects whose longest dimension is shorter than the wave length of the radiation striking them only act to scatter the radiation, and reflect very little back toward the source. Obviously, then, the shorter the wave length of the radiation, the smaller an object may be and still return a usable echo, and the more details of large objects will show up on the radar scopes.

MEW radars showed easily distinguishable echoes from storm clouds in which there were sizable drops of liquid water. Since this sort of cloud almost invariably indicates severe storm conditions within and near the cloud, MEW permits ground controllers to guide flights around storm areas, or conversely, to direct them to cloud cover when desirable.

But MEW was by no means the only equipment developed to utilize the high powered micro-wave magnetron. Short waves meant radar of real efficiency could be carried in aircraft, and a number of spe-

cial purpose types speedily went from drafting board to production line to battle. One of the most potent was the equipment for bombing through overcast—BTO—which permitted bombing with reasonable accuracy through complete overcast, smoke and darkness. This was a micro-wave radar mounted in a bomber, with its sweeping beam directed straight downward to cover a circle on the ground whose area depended on the height of the plane. The ground below showed up on the scope very much like the map of the area, with water areas dark except directly below, and land areas a varying brilliance according to the topography. Prominent works of man like bridges, docks and buildings show stronger echoes and sharper, more regular outlines, partly because their smoother surfaces reflect better than the soil, and partly because of the metal contained in most man-made structures.

The first BTO equipment, usually called Mickey by the flight crews, moved from United States labs to the airfields of Britain in the three-months from July to October, 1943. In that brief time twelve pre-production sets were turned out, almost literally bent into shape from old parts, twelve crews received a highly concentrated training program in twelve bombers carrying the sets, and uncounted hundreds of "bugs" in equipment and methods of operation were tracked down and eliminated by practically sleepless engineers.

On November 3rd, nine wings of 8th AAF bombers led by the twelve Mickey ships struck at Wilhelmshaven, the target for the 8th's first raid on Germany nine months earlier. The success of this strike was so apparent that the bomber squadrons immediately adopted Mickey for their own, and, led by the same twelve ships—soon nicknamed Pathfinders—they flew more raids in November than had ever been possible in a single month, even during relatively good summer visibility. During the following month it deluged Nazi Germany with 24,000 tons, its greatest weight of bombs to that date, and for the first time equaled the RAF's monthly tonnage. On December 13th the largest strike mounted to that date —740 heavies—raided Bremen and Kiel with stunning effect. Straight on through the winter the destruction continued, in spite of the fact that even November and December had only four days which permitted visual bombing. The Pathfinders and their BTO Mickey radars led the squadrons to the task, ably aided by some older, lower frequency—longer wave length—British radars installed as standby equipment.

More and more Pathfinders got into service as production of the BTO radar went up and crews were trained, and Nazi civilians began to feel the terror by night with a helpless dread. Not only did blacked-out bombing improve, but the Mickey operator was able to correct navigational errors in such a way that the targets selected by strategic commanders were hit, and fewer planes were lost from fuel

exhaustion caused by hunting for targets and erratic courses to and from the target area.

But another application of radar, this time by the enemy, began to take a toll of bombers and interfere with our raids. The Nazis, stymied on use of microwave lengths by lack of a suitable magnetron transmitter tube, had brought their medium wave fire control and GCI radars to a high degree of efficiency. Their radar controlled batteries of ack-ack guns were massed near important industrial centers, and their fighter plane strength, weakened but at this time by no means exhausted, was thrown into the attempt to stave off the day-and-night smashing by the RAF and AAF.

The advantages of radar controlled gunfire during poor visibility are obvious, but another function of radar not so generally known is also called into play in such equipment, with results far exceeding the limitations of optical methods. A specially designed radar of high precision and well maintained can measure distances with an accuracy of plus or minus 25 to 30 feet, *at any range it can pick up the target*, and angles with an accuracy comparable to good optical systems. This accurate range measurement, and the ability to "lock on" a target and follow it automatically through any sort of maneuver made the radar controlled flak batteries things to dread, especially for heavily laden ships making runs on a target.

Something had to be done, and various expedients were tried in efforts to confuse the enemy radar, or destroy the accuracy of his gunfire. One of the oldest expedients was to take evasive action over enemy flak batteries, which meant certain maneuvers of aircraft involving erratic changes of height and direction, so that flak shells aimed at a plane's predicted position would not find the plane there when they arrived. They only worked well where flak was thin, for in heavy areas, the Nazis resorted to pattern firing, using a deliberate dispersal pattern for several batteries to give a shotgun effect.

Another expedient was jamming of the enemy radar receivers with strong random or patterned transmission on the same wave length, with equipment carried in the flight of bombers. This was only partially effective, since the jamming transmitter could be tracked reasonably well, although the range accuracy was poor with such methods.

Of course jamming worked both ways, and Nazi ground stations attempted to jam the BTO equipment in the bombers, but were only able to hamper the longer wave equipment. Indeed, the whole history of radar jamming was in general a record of failure or limited success, except in a few special instances.

But another device which was tried by both sides proved to be much more effective when skillfully used. This was nothing more complicated than a reflection device which returned a strong echo when scanned by radar beams of the wave length to which it was adjusted. It

consists of small strips of aluminum foil with paper backing, cut to a physical length about one half the wave length of the radar which it is desired to confuse. These strips are effective reflectors of radiation of wave length plus or minus ten percent of the length to which they are cut. When bundles of loose strips—called "window", because it produces a bright window in the enemy scope—are dropped from aircraft, the echo returned from the strips is very similar to that from another aircraft. An entire group of ships dropping window at regular intervals clutter up the enemy scopes, cause him to misdirect his fighter planes, and cause his radar-directed flak batteries to fire wildly in all directions, if the window is used skillfully.

Books could and probably will be written about any one of a dozen other radar applications during the war, but we can only touch on a few of them here. Several navigational aids operating on radar principles but at low frequencies were put into service, using systems that were employed to guide bombers to precision targets during the war. These are still under restriction, but will undoubtedly be put into peacetime service on a wide scale before long. An interesting example of the needless delay sometimes caused by hampering restrictions without logical cause is found in the history of window, which was just described. The British and Americans knew of its possibilities in 1941, but decided to keep their knowledge secret until a strategic time for its operational use occurred. At about the same time the Nazis got the same idea, and did not use it, *for the same reason.* Obviously someone was wrong about the advantages of secrecy in this case, which surely could not work for both sides.

Some other radar devices of note were beacons, which sent back a signal when scanned by radar beams, allowing planes to "home" on them to excellent advantage in troop carrier and paratroop operations. Then there were altimeters which operated on radar principles, giving altitude with an accuracy far superior to the barometric method, and certain airborne radars used to search for submarines in the Atlantic, which Hitler credited with breaking the back of the Nazi U-boat fleet.

This radar operated on such a short wave length that the Nazis were unable to detect its radiation, and thus could not tell when they were under observation. As a result, more than one hundred Nazi undersea craft were caught and sent plummeting to the bottom during the two months of hunting with them in the summer of 1943. When the flabbergasted Nazi commands sent two submarines to sea equipped with research equipment and scientists to discover the cause, they, too, were smashed, in less than two weeks.

As the war ended, even the Schnorkel tube, which permitted a submarine to remain submerged for a month at a time, was being picked up by Allied radars at moderate distances.

Are such radars and the principles they employ adaptable to civilian, peacetime use? The answer is yes, but not on the scale some sensational stories would suggest. Aunt Minnie will not keep an eye on the kids in the yard by radar, nor will the privacy of the bath be invaded by radar-equipped Peeping Toms.

Navigation of ships and aircraft can and will be enormously improved, particularly with regard to safety and reliability. Weather service, with the aid of radar storm tracking, will be able to predict the movement of storm areas with a high degree of accuracy. Weather balloon ascents into the upper atmosphere can be tracked by radar to study air movements aloft, with a probable increase in long-range weather service efficiency.

Radar control of pilotless aircraft for experimental flights may also be a useful adjunct to aviation research, although this can also be accomplished by ordinary radio means with reasonable accuracy. A number of other special applications of the seeing waves are also in the cards, but will probably have little effect on the general public except indirectly.

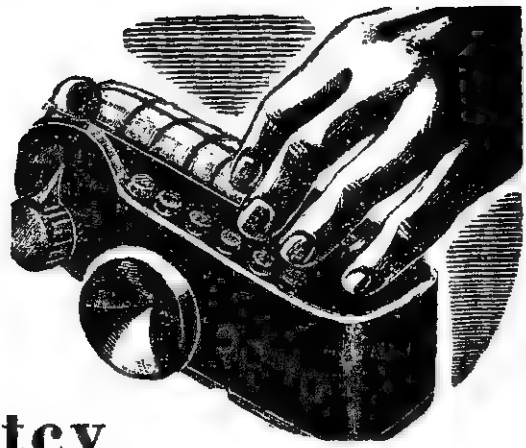
All in all, the new tool will handle certain big jobs well, particularly for air and sea transportation, but it will probably not be installed in 1946 model cars, or 1956 either, for that matter. Ground clutter alone precludes such use, to say nothing of cost considerations, and radar is not cheap. Much has been said of the fine bargain we got in the atomic bomb at 2 billions of dollars outlay. Radar was an equally good bargain at a total almost four times the sum spent on the bomb (7.5 billions), and will continue to pay off in serving human needs in peace as in war. For proof of the bargain, look around at America's unbombed cities and production centers, and weigh what was saved by radar against what was spent.

THE END.

"THE SKYLARK OF SPACE" (In Book Form)

For the long-time science-fictioneer, the news that E. E. Smith's "Skylark Of Space" is at last in book form will be sufficient; for the newer reader, no review can adequately describe it. But it's one of the science-fiction top classics.

Do NOT write us; write The Buffalo Book Co., 271 Doyle Avenue, Providence, R. I. It has illustrations by Schneeman, and sells for $3.00.



Bankruptcy Proceedings

Artur Blord had been in trouble—of his own doing—before. He knew how to protect himself against enemies. But it was his friends who were really dangerous!

by E. MAYNE HULL

Margaret Merrill listened with quiet thoughtfulness as Artur Blord talked.

"The trouble," he was saying, "is that nothing can really happen any more in the Ridge Stars. Every day the Artur Blord Holding Company does several billion stellors worth of business, but it's all cut and dried now. Even the crooks who try to diddle us conform to five or six trite formulas."

She was thinking, "My first theory was right. All his other secretaries have taken the wrong tack with him. They've roused his interest in some way not connected with sex, and then they've made the mistake of playing the sex angle to the limit. As a result, they're all acting the nursemaid to a bunch of kids, wondering just what went wrong."

She wasn't sure of that, of course, but vague stories she had heard seemed to point that way. There must be some explanation for the way dozens of secretaries retired on enormous pensions to separate luxurious estates located in the garden spots of the Ridge Star planets.

Well, that wasn't going to happen to her. She was going to stay right here in the Artur Blord sky-

scraper on Delfi II, living a life exciting and dazzling beyond all her dreams. Blord was speaking again:

"Take the Corbett case that Magrusson has been pushing at me the last few days. The old stuff. Disloyal male employee. Responsible position as buyer. For years he's been buying goods from firms that paid him a commission on the side. The way I'm feeling, I wouldn't think of prosecuting him except for one thing. He let them sell him shoddy goods. That's unforgivable."

As he paused for breath, the eldophone on his desk began to buzz softly, and the blue light of an interstellar call made a haze of color above the light cup.

"So far as I can see," Blord said flatly, "I have exhausted the excitement possibilities of the Ridge Star group."

He picked up the receiver. "Artur Blord speaking," he said.

A scene of deep space darkened the eldophone plate. There was a spaceship in the distance, and off to one side a red point of light.

Blord frowned. "What th—" he said.

An urgent voice cut him off:

"Mr. Blord, this is Captain Gray, of your freighter, *Zand*. I have just been fired on by the ship you see."

Blord said grimly, "Fire back. And get that body out there. It's a human being, and he's still alive if the red color is not fooling us."

"That's what I wanted to know, sir. I guess they didn't see me at first. They tossed whoever it is out, and I saw the red point of 'life' on the plate."

The advantage was with Captain Gray. The other ship had catapulted the human being into space while proceeding at speed. At the last instant, those aboard must have become aware of the ship behind them. They were striving now to turn around, and great flashes of energy poured at both the moving red dot that was a human being, and at the *Zand*.

The situation was basically intolerable. With two ships firing atomic energy at each other, the incident had to be over swiftly. The ending was double-barreled. The *Zand* flashed up to the human body. Tractor beams drew him into an air lock. And simultaneously the stranger ship turned tail and ran at top acceleration.

It was instantly out of sight as a ship, though it continued to glimmer yellowly on the eldoplate for some minutes.

Blord said softly, "Good work, captain. You'll get a bonus for bold, successful action for yourself and the entire crew. Now, rig up a projector when you revive the fellow, so that I can watch the proceedings, and perhaps ask a few questions."

Blord leaned back in his chair, and sighed. "Imagine," he said, "I'm down to this stuff. A petty murder of some kind. What was it the patrol commissioner said to me the other day—there are ninety thousand known murders committed every month in the Ridge

Stars? That wouldn't normally include the attempted murder we accidentally saw. Most killings in space merely result in a category of 'missing' for the person involved and—"

He was interrupted. Captain Gray's face came onto the screen for the first time. It was a rough-hewn countenance, darkened by the glare of many suns. The officer said gravely:

"I'm sorry to report, Mr. Blord, that the man is dead. He was shot before he was thrown into space."

"Oh," said Blord.

He made no further immediate comment. But actually his interest in the affair began at that moment.

It was about nine hours later when Blord's yacht matched velocity with the *Zand*. A few minutes after that he and his experts climbed aboard the freighter—and the investigation began.

With bleak eyes he stared down at the dead man. About forty years old. An intelligent face, sensitive, confident — that was important. Not even the certainty of death had shaken the innate confidence of this man. Such people were never completely untraceable in two hundred planetfuls of nonentities. Somewhere there would be a record of his personality.

The photographer was pressing towards the body, and so Blord stepped back. He grew conscious that Captain Gray had moved up beside him, and felt impelled to explain his presence.

"Two things roused my interest," he said. "They made determined efforts to destroy the corpse. They risked their own lives for several minutes in a gun duel to prevent you from getting the body.

"My conclusions," Blord went on, "are simple. The killers are tough, experienced scoundrels who, normally, would do a thorough job of destroying identifying marks on their victim—and let it go at that. The fact that they were not satisfied in this case with ordinary precautions indicates that it's an important murder. The first evidence that I'm right will be that we'll find nothing on the body that will help us to identify it. I'll bet on that."

He won his hypothetical bet. Two men literally took the clothes of the corpse to pieces, in their search for clues. They abandoned the effort finally, and one reported:

"The cloth is a common artificial wool. Billions of yards are sold every year. Without tailor marks, it's—"

He shrugged, and he was not the only one. The X ray man said with the anger of frustration:

"The fool was in perfect health. Never had a tooth filled or out, never had a surgeon cut into him. Won't people ever realize that the patrol has complete records of operations and injuries available at a moment's notice by automatic electronic comparison?"

Apparently, the same kind of fools made sure that the patrol had no record of their fingerprints.

Earlier, Blord had had the captain eldophoto the fingerprints to Margaret Merrill, and had her route them through office channels, the pretense being that a checkup was being made on a new employee. Before he reached the *Zand,* the patrol had already reported laconically, "No record."

Now, Blord stepped to the corpse, and carefully examined the smashed head. The beam of energy had entered the head just in front of the right ear, and had torn through the brain, emerging from the left temple. Death must have been instantaneous, but the direction of the wound was interesting in itself.

Satisfied, Blord drew away, and motioned for the body to be covered. He said:

"My theory is this. He was shot just before he was shoved into space. Shot from slightly behind and to one side. Whoever shot him couldn't know for sure that the wound was fatal, because the blow from the energy gun must have helped to knock him out into space."

He paused, scowling. But there was no escaping the fact that, for the moment at least, that was his only hope. The idea was rational enough. As time passed, and memory grew dim, the murderer's doubts would increase.

"We must assume," Blord said thoughtfully, "that he'll try to find out for sure. And since he undoubtedly tuned in on Captain Gray's eldophone talk with me, he knows where to look for the information."

He paused again, but this time there was anticipation in his lean face.

"We'll make up somebody to look like the dead man and"—his lips tightened—"I know just the chap who'll be glad to volunteer for the job—a former buyer of mine named Corbett."

Blord settled his space yacht into its cradle of forces atop the two-hundred-story Blord Building. Then he jumped down to the garden, and walked into his penthouse office. His entrance caught Margaret Merrill in the act of rising from his chair behind his desk. She looked startled as she saw him, then she smiled.

"I have some messages for you," she said brightly, and vanished into her own office. She came back a few minutes later, completely calm, and saw that she had left her shorthand notes on his desk. The second evidence that she had been up to something brought no shock this time, but she was very annoyed at herself.

"It's his luck," she thought, "the fantastic luck he's famous for. That's how he's gained his reputation for knowing what's going on. Imagine coming back at *that* moment."

Her confidence returned. Just let him try to figure out what she had been doing. She was pretty sure the great Artur Blord had never learned shorthand, so he'd

only be able to wonder what it was all about.

She saw, relieved, that he seemed to be immersed in the papers she had brought. She picked up her shorthand notes casually, and returned to her private office. She was quavering as she sat down, but gradually a glow spread along her nerves.

"I've done it," she thought, "where even he has so far failed. I've found out at least one important fact about the murder."

It had happened accidentally. She was passing through Blord's office, and it was a chance glance up at the enormous three-dimensional wall map of the Ridge Stars that brought the idea in one flash of insight. An instant later, she switched on the map lights, and was sitting in Blord's chair, where the map controls were located.

She kept shifting the viewpoint. The map was a size variant, so that the onlooker could have the illusion of withdrawing into remote space, and thus see all of the two hundred-odd stars from every possible angle. Or else he could approach so close to any particular sun that it filled the entire map field.

She took prolonged aims along lines of sight, and each time swiftly noted down the names of the stars that came into the line, in separate columns. Her brain wave was soundly rooted in logic. Captain Gray and the stranger had been traveling in the same direction before the stranger started to turn. Now, obviously, the mystery ship was both going somewhere and coming from somewhere, and one of those directions might be important to know.

Two main courses quickly dominated the welter of possible routes. First, the direction from which the enemy was coming. The suns in line were Lanvery, Leprechaun, Lorelei—

She stopped there, because, "Lorelei. Why, of course, Lorelei."

Blord didn't get to that stage until three days later. After dark on that third day, his protective agents brought in the disguised Corbett, and a big-toothed individual who sullenly gave his name as Slikes. Slikes admitted, since he had been caught in the attempt, that he had tried to kill Corbett. He seemed to have an idea that no further information would be extracted from him, but this turned out to be wrong.

After the interview, Blord nodded curtly to the ex-buyer. "All right, Corbett, you've done your share. If you will go to Magrusson, you will receive a written release, the company will forswear all right to sue you, and will make no effort to recover from you the money you accepted as bribery when you were one of our purchasing agents."

Blord paused, studying the other curiously. "By the way, how much did you make out of your connection with us?"

"Ninety million stellors," said

the lean-built Corbett jauntily, and sauntered out of the office.

Blord turned to Slikes. "It looks as if this time crime is going to pay all around. Luckily, you talked, so I'm going to put you on one of my Earthbound freighters with a thousand stellors and permission to get off anywhere you want after the ship leaves the Ridge Star group."

When the hired killer had been taken away, Blord examined the information he had secured. It wasn't much, but in one sense it was everything. Whoever had hired the man had *accepted* that a dead man was alive. He had given Slikes the name of his victim.

Out of all that vast universe of stars, with its billions of inhabitants, a name had come out of nothingness, and the immediate rest would surely be simple.

It was. Who was Professor Philip Amand King? In twenty minutes, the central library of Suderea had the information, with an unmistakable photograph, and a life history, which described the professor as the expert on the problems of the dead zone of the Lorelei sun.

"Lorelei," said Blord, aloud, explosively, after he had broken the connection. "why, of course, Lorelei."

He buzzed for Margaret Merrill. He told her briefly what he had discovered, and what he wanted. The girl nodded, and went out, smiling to herself. She had had the information for nearly three days, and her own plans were complete. She spent the next three quarters of an hour reading, then took in the typed sheets that she had had ready for nearly seventy-two hours.

There were three separate sheets. The first one said:

During the past two years thirty-seven freighters have been caught by Lorelei. Altogether, in the history of the Ridge Stars, one hundred and ninety-two ships were lured to destruction by this sun, and there is no question that those lost previous to five years ago were accident. In the opinion of our transport department, the total of the last few years is not so out of proportion as it appears to be. Space traffic has jumped a hundred-fold since the introduction of the locally owned space drive a few years ago. All spaceship repair services have been overstrained, and the resulting inefficiency is believed responsible for the disasters.

The second page said:

Of the thirty-seven vessels recently caught by Lorelei, six were serviced by us, seventeen by Squire & Blakely, four by the Corliss Company, and two each by each of the following named firms.

The list of company names was appended. The third and last page was brief:

Professor Philip King, who was doing research on the problem, has been missing from his Fasser home for a month. There is no record that he or anyone else has discovered a method of entering the dead zones of Lorelei.

Blord put down the papers grimly. The situation was clarifying. He looked up at the girl. "The way I see it, Margaret," he said, "is that Professor King in-

vented a Lorelei zone motor, and then allowed himself to be inveigled into using it illegally, that is for salvaging vessels already caught by Lorelei. That's not too hard to understand. The law allows salvagers only fifty percent. King and his group took a hundred percent. Then, a short time ago, King discovered that the group was actually luring new vessels into the zone. At that point he balked, and was promptly killed.

"The killers think he's still alive, but they are assuming that he hasn't dared say anything, because after all, he's guilty of a crime too. But enough of reasons. I want you to investigate the Squire & Blakely Spaceship Service & Repair Corporation. I consider it suspicious that seventeen of the ships recently caught by Lorelei should have been last serviced in their shops."

It was more than suspicious. They could have bribed mechanics in other firms to sabotage an occasional ship, as a cover-up for their own activities. But those mechanics would have to work on ships to which they were assigned. Only in their own shops would the guilty firm be able to select the freighters with pay cargoes.

Blord called after the girl, as she was returning to her own office, "Check on that cargo angle."

His nervous system was moving along an organized path now. Almost without looking, he touched the necessary keys on the eldophone, and, in a minute, the plump face of Magrusson, the general manager of the Artur Blord Holding Company, appeared on the plate. Magrusson stared at him gloomily, as he explained the situation. When Blord had finished, Magrusson said:

"Listen, Artur, why not let the space patrol handle it?" He must have seen the look on Blord's face, for he added hastily, "Now, don't get mad. I know you don't like calling in the police on anything you've started."

Blord began, "For once, that is not the reason."

He stopped, because Magrusson's expression showed that understanding had come to his swift mind.

"I see. Evidence."

"Exactly. The possibility of a court conviction is so dim that it cannot be considered."

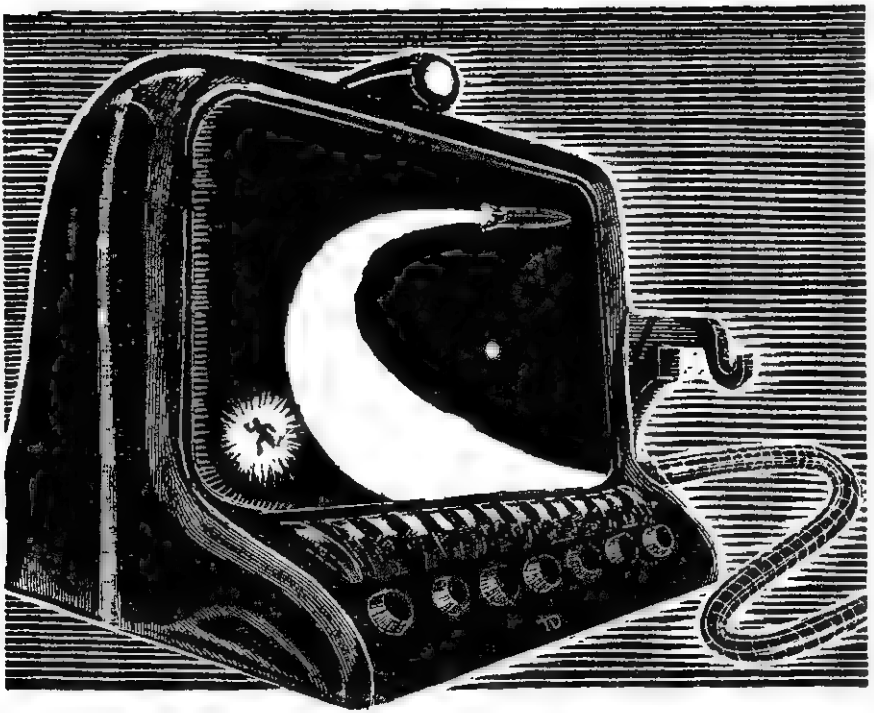
"But what are you going to do?"

Blord was grim. "Whoever I decide is behind it, I'm going to bust wide open."

It must have sounded wild. Magrusson started violently. Then he looked alarmed. Then he said in a voice that trembled:

"Artur, you know better than to talk like that. You can't break a firm these days by any kind of pressure, financial or otherwise. The Companies Commissioner could close our entire business if you tried it."

It wasn't what Blord had meant, and he was briefly irritated that he should have been misunderstood. Swiftly, however, a portion of Magrusson's genuine fright trans-



mitted. Blord visualized the trillion stellor Blord economic empire being forcibly liquidated. And sat shuddering. At last, he caught himself, and said savagely:

"I'll think of something."

They were *not* going to get away with it. The rage that came was only partly rooted in morality. Mostly it was a conviction of being personally affected whenever anybody interfered on a wholesale scale with the normal lives of people—deliberately damaging ships, so that their automatic evasive devices would not react when they were near Lorelei. Bloody, murderous scum.

You bet he'd think of something, even if in the end there was no other method but evidence that would hold in court. For several seconds he sat frowning, then he remembered his reason for calling Magrusson.

"I'm leaving for Lorelei in a few minutes," he said, "and I want to give you some instructions."

He gave them. Twenty minutes later he was on his way.

The following "morning"—Suderea time—Blord called up Margaret Merrill. The call was still on the eldo half an hour later, as he was eating breakfast, when it struck him that she should have replied long ago. He sat, frowning, then went into the control room, and eldophoned Magrusson.

The plump face came on in a matter of seconds.

"Miss Merrill?" he said. "Wait a minute, I'll see—" His face blurred, as he talked to someone else, then grew clear again. He said succinctly, "The building guard office says she went out last night immediately after you left, and she hasn't come in yet."

Blord sat silent, then shrugged. "She's been acting odd lately. If she keeps it up, I'll have to get myself another secretary."

He changed the subject. "Got that information yet?"

"Not yet. But the ships are gathering."

"O. K."

Quite a sun was Lorelei, but not visibly so. Blord pulled the cap off the eyepiece of the telescope, made a few adjustments, and looked out—into a blackness that was almost like pitch. A few stars glittered palely in the remote, tremendous night. But Blord knew what he was looking for, and so after several minutes he saw the outline of the famous dark star.

Sixty percent helium was that black sun out there. Helium the inert long ago made sluggishly active by the hellfires that had once raged around it. Not active enough ever to have explosive life of its own, but alive nevertheless.

It was a half life of terrible instability. Like a monstrous leech, the masses of helium had sucked up all the flame energies of what had been, ages before, a blazing sun. And it hadn't been enough. Frustrated, prevented by the hugeness of the space-time continuum and by its own slow speed from approaching other suns, it floated in the darkness so greedy for energy that no ship could come near it without having its electric, artificial gravitic and all radioactive energies radically reduced.

Blord's examination was briefer than he intended. He felt a sharp blow. It was all-pervading. It struck into every part of his body, and was followed instantly by an incredible lightness. In the depths of the ship, the massive atomic motors throbbed erratically—and stopped.

His vision swam. His body threatened to swell like a balloon and explode. But a thought had come into his mind, and it was that that held his senses together in spite of the dangerously abrupt termination of gravity.

The thought was, the alarms! The Lorelei alarms and relays had failed.

He felt an agony of terrible comprehension. His ship must have been sabotaged when it was last serviced. How could he have neglected such a possibility? The reality closed heavily over that fury of self-condemnation.

He had flown into the dead areas of Lorelei, the destroyer sun.

It took a while to explore the extent of the disaster. The yacht was falling almost directly towards the sun. Its speed, Blord remembered, had been about thirty thousand miles an hour before he had

turned on the super-speed anti-gravities. Now that those greater engines were off, the machine would have reverted to its original thirty thousand miles an hour.

He had about fifty tons of high explosive aboard. With that he might, just might, get his hundred thousand ton pleasure ship into an orbit. Nothing more.

Blord began to laugh, softly, humorlessly. He had often wondered what he would do when his time came. And here it was. *Here it was* A sun that subtly strained the electronic structures of all objects in its vicinity. Instantly, machines dependent on delicate atomic interactions ceased to function.

Theoretically, a new formula of pile arrangement could make them all work again. And, presumably, Professor King had discovered just such a formula—

The unnatural laughter faded from Blord's lips. Memory came jumpily of why he was here.

He began to turn a wheel that shoved at a bigger wheel, which shoved at a still bigger wheel, and so on, until, under the control dais, a ten-foot wheel with an Earth weight of fifteen tons was spinning at approximately thirty revolutions a minute. At the proper moment, Blord pushed in a clutch, and an electric dynamo began to operate.

It was very literally an emergency power plant. Electricity was too coarse an energy to be powerfully affected by the Lorelei sun. The gadget was useless as a source of interstellar drive power. But its builders claimed that, once set in motion, it would run for hours in gravity-free space, and, what was more important, unlike the batteries, which he also had for emergencies, it was capable of transmitting the eldo energies over astral distances.

The power plant began to prove itself. A light flickered into existence above the eldophone, and then the eldophone plate began to glow. Blord adjusted the dials, and made his connection with the city Suderea. After half a minute, Magrusson looked casually into the plate, and said:

"'Lo, Artur."

The plump man's calmness startled Blord. It did more than that. It brought awareness of how tense he was. He grew conscious that he was leaning forward ready to ask his questions with machine-gun rapidity.

Magrusson, calm, normal, safe in his faraway office, stopped the words. Blord smiled in a sickly fashion, and realization came that he was separated from the rest of the human race by an emotional as well as a physical abyss. Before he could recover his speech, Magrusson went on easily:

"Uh, Artur, I've got that information you asked for about Squire and Blakely. Here, I'll hold up the sheets while you read. That's the quickest way."

Blord read. He had had no intention of bothering at this vital hour with anything so drab and unimportant as a study of the

personalities of enemies who were light-years away. But he recognized that, without knowing it, he had become nervously unbalanced. And that *was* important, though now that it had happened it would be difficult to rectify.

He read jumpily. It required several seconds before the first words took hold of his normally swift mind.

In its small way, the document turned out to be quite an amazing account. Andrew Squire and Leslie Blakely were among the less prepossessing human rats who had settled in the Ridge Stars. Their record of occupations included the manufacture of the sex drug and the seven-day poison. Both men had been on trial for murder, and had been released because of insufficient evidence. The space patrol had traced to them a particularly obscene form of white slave trading in the remote frontier stars, but at the last minute, vital witnesses disappeared mysteriously and forever. Of parts of their adult lives, there was no record whatever.

The partners had mellowed with age, and also a certain caution had struck into them. About five years before, they had entered upon the manufacture of legal articles, branched out into spaceship repair work, and were listed in the interstellar directory as having cash and assets to the total of about three hundred million stellors.

Blakely's hobby was listed as "Women." Squire's activities were covered under the more general description, "Nightclubbing."

Towards the end of the last page of the document, Blord was skipping whole sentences. Because, actually, it *didn't* matter now. He looked up finally, and saw that Magrusson was staring at him oddly.

"The funny thing," the general manager said, "is that our information center tells me Miss Merrill secured all the facts in those pages nearly three days ago."

"Eh?" said Blord.

Magrusson added, "She still hasn't turned up."

Blord groaned. "That child," he said.

He had to let the matter go. Already, he had spent far too much time on this conversation. He said hurriedly:

"Where are the ships?"

"They'll be in the vicinity of Lorelei in twelve to fifteen hours." He broke off. Artur, what's the idea behind all this?"

Blord scarcely heard the question. He was pondering the time limit, narrow-eyed and dissatisfied. In fifteen hours, his battle would be won or lost, his body burned to a crisp or tossed out into the absolute zero of space. He had a very strong and desperate conviction that in fifteen hours his life would be hanging on a thin thread.

He sighed finally, said, "What about the money? How much did you get together on such short notice?"

"Commander Jasper has fifty million stellors aboard and—"

Magrusson stopped, eyes wide. "Say, I get the whole setup now. Whoever is behind the piracy will have a salvage ship on the spot. Some of the doomed vessels would plunge straight into Lorelei, and they'd have to be stripped in a matter of days. Of course, they may have been scared off by what you discovered, but if they're bold enough, and understand in the fullest sense the impossibility of getting evidence in space, they wouldn't let anything short of a year-round space patrol watch bother them. If they're there, the money will—"

There was a jar that nearly knocked Blord out of the control chair. He felt a hollow sensation in the pit of his stomach as he realized what had happened. A heavy object had bumped into the yacht.

The salvage ship had arrived.

Squire, of Squire & Blakely, was drunk. He leaned heavily against the bar, and the only thing that was **clear** was that he still could quite **believe** that this slim and friendly young woman was interested in him. Margaret Merrill said:

"*Hic,* have another drink."

The man looked at her blearily, but with the first hint of comprehension. He was a short, squat creature with a surprisingly clean-cut face. He looked at her, his eyes narrowing the slightest bit. Drunk, he thought.

That was his good luck.

He took the proffered drink. "Thanksh," he said. "But now what were we talking about?"

"You like my idea. You're going to hire me for your company."

"Thash right. Come around tomorrow. Don't think I won't remember about thish because I've been drinking a little. Will you let me see that little gadget again?"

Margaret drew it out of her purse. It was a device she had secured from the Artur Blord Co-Ordination Department, that most marvelous of organizations. It was called a healthograph, and it had a most interesting history, which she had no intention of telling an intoxicated man.

"This is not the same one," she said. "I've got two. I told you that, as soon as it's used once, it can't be used again for about twelve hours."

Squire seemed not to hear. He took the device and put his fingers on the activators. He stared, then, fascinated, at the dozen small dials.

"Whash the matter with it?" The drunk sounded peevish. "Why did the hands go all funny like that?"

"It needs a little work done on it. I have a science degree, and I know exactly how to fix it, and if I could use your laboratories for a few weeks—"

She left the sentence dangling, and she had to suppress a smile as she saw the look of greed come into the other's face. Squire was so transparently a crook when he

was drunk that it was just a little painful. The man licked moist lips.

"In *our* laboratory," he said. "Yes, yes, you must come and work out the final problem in our shops. We shall provide you with every facility. Here"—he fumbled with a sobering intensity in his pocket—"is my card. Come and see us tomorrow."

"And don't think I won't either," said Margaret. "My bank account is close to rock bottom."

She let him drop her off at an apartment she had rented uptown, near the local branch of the Squire & Blakely Enterprises. Squire had some vague intention of coming up with her, but the doorman and the taxi driver helped her to discourage the plan.

She slept happily, and woke up still convinced that her plan would work. Squire and Blakely had spent their lives making money out of other people's stupidity. Surely, they would accept the reality of one more sucker.

She was not unduly surprised when the desk clerk downstairs informed her that Andrew Squire had come to escort her to her new job.

Blakely was a bigger edition of his partner, strong looking, suave, deadly. He examined the healthograph with cruel, sleepy eyes. Squire had evidently talked to him early that morning, because he tested himself, and said finally with satisfaction:

"Right. I omitted vitamins C and B-1 for breakfast, and, of course, I didn't get my full quota of the others in just one meal and—Oh, oh, there she goes."

Margaret surmised that the gadget had started to register wildly. She saw that Blakely was looking at her questioningly with those strange, quiet eyes. It was clear that a far more detailed explanation of the fault was in order, than had satisfied the drunken Squire the night before. She launched into it without hesitation, as she had heard it explained to Blord by a Blord Corporation physicist, weeks earlier.

The problem involved had to do with the nervous energy of the human body. This energy reacted in the most subtle fashion imaginable when the system absorbed vitamins, minerals and calories. The original inventor had rightly assumed that the varying rate of absorption could be measured against either a standard requirement, or the requirements of a particular individual. In the latter case, the indicators fixing the amount needed would have to be set after a medical examination.

After about a minute, the gadget, as originally invented, became saturated with energy. It ceased to respond to subtle variations, and so became useless for about twelve hours. It was a problem in energy control that the inventor, five thousand years before, had failed to solve. In spite of that, the gadget had made a fantastic fortune for the patent owners. But like so many devices

of a certain period, it had been oversold. The company, geared to produce healthographs by the billions, lost money producing only millions, and so production was stopped. It was never resumed.

The Co-Ordination Department of the Artur Blord Holding Company had rectified the energy saturation problem in less than an hour, three weeks before.

Margaret neglected to explain that last, but she was completely frank about the history of the healthograph. She could see Blakely's eyes widen ever so slightly as the man realized that no patent could be taken out on the original invention, but that the improvement could be patented.

"And that will not be very hard," Margaret explained truthfully. "The discoveries that have been made the last few thousand years about the control of energy make the solution a simple matter of finding the most effective method."

She realized, when she had finished, that she had made a sale.

"Any extra equipment you need," Blakely said expansively, "order it. We like your idea, and we play ball with those who work for us."

Margaret had come prepared to be businesslike. "I'll need a few things," she began. "If I could have a little leeway about getting equipment—"

She held out her list. Blakely did not even glance at it. Instead, he said grandly to his partner:

"Mr. Squire, will you dictate a memorandum to the Registered Circuit, authorizing Leah Carroll—" He glanced at Margaret. "Have I the name correct?"

Margaret nodded, and Blakely went on, "—Authorizing Leah Carroll to order equipment in our name?" After Squire and the girl had signed, the junior partner, who was turning out to be very much of a senior in the way he dominated the other, faced Margaret.

"Satisfactory, I hope?"

They were impressing her with their openhandedness. "I can't," said Margaret in her most grateful voice, "thank you enough."

Now, she thought, they would contract to pay her while she worked in their laboratory. That way, any work she did on improving the healthograph, would be their property, free of all royalty. She signed the contract with a flourish, and asked if it would be all right if she didn't start work till the following morning.

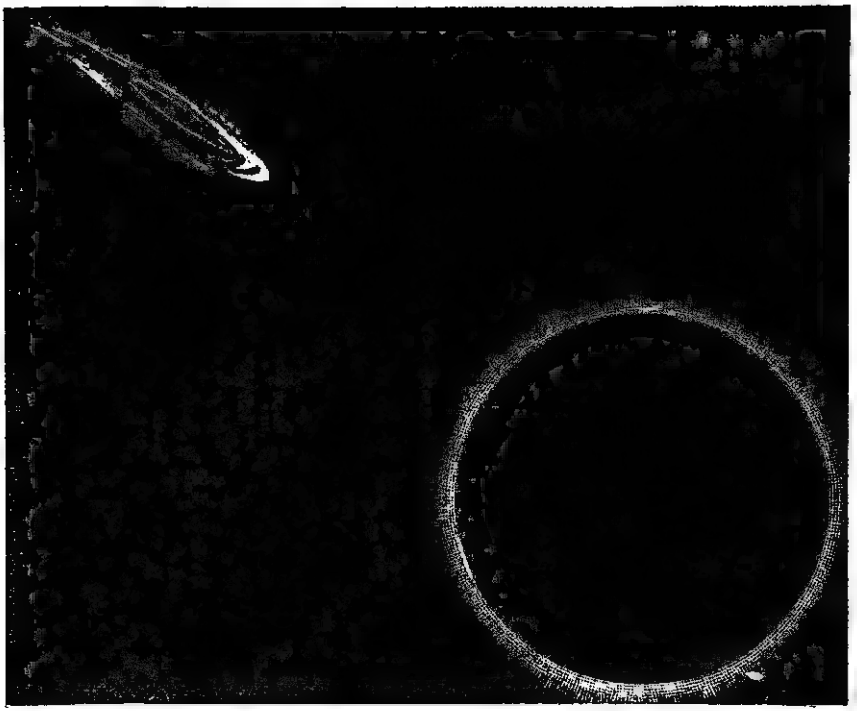
It wouldn't do to be too eager.

After she had gone, Squire looked at Blakely. "Nice girl," he said. "A little dumb maybe but—" He hesitated. "What are we going to do with her?"

His partner looked at him coldly. "What do we usually do with people who would make a nuisance of themselves if we let them live?"

Squire said, "You really think that's necessary?"

Blakely shrugged. "It's the simple method. Life is complicated enough, now that we've got



to watch our step in that Lorelei business."

He paused. He fixed his pale eyes on Squire. "Now, get this straight," he said. "The moment she fixes that gadget, she dies."

Sitting in the control chair, Blord had one of his rare moments of depression. A picture came of himself alone in a powerless yacht. Artur Blord; the cleverest and wealthiest operator in the Ridge Star area of space, on his own at last. Blord felt no shame at the conceit behind that comparison. What mattered was that it had never struck him before quite so forcibly how much his past exploits had depended on other people and on a vast array of machines.

Now, even the contact with Magrusson was an illusion. It had brought him a few details, useless now. This was not the moment to think of what he would like to do to the men behind the salvage vessel.

In spite of his logic, Blord hesitated to break the connection. He had to assume that this was his last chance for an eldophone conversation with anyone. It made the decision to break off or not a big one.

He said at last, "Don't try to contact me directly with any further information. Just put it

on the recorder. I'll call you when I want you."

That was to insure the eldophone plate did not suddenly give off a telltale glow.

Blord finished swiftly, "And Magrusson! sleep at the office. I want to be able to get in touch with you, night or day until further notice. And now, good-by."

He cut the power before the other could protest. He reached up and switched off the solitary light bulb. He sat then in darkness, one man alone in darkness. Distinctly to his ears came the sound of mechanical hammers at one of the air locks. Alone in the darkness, waiting.

The mood passed, but only when he suddenly realized there were things to do, still. Using an electric torch, he raced to the emergency cabinet. It took a minute to strap a belt of oxygen capsules around his waist under his shirt. Then back to the control room. He fumbled for the latch that swung the control chair off its base. He pulled hard at the chair. Where the chair had been, there was a circular hole in the floor. Its tunnellike walls gleamed in the light of the torch.

For a moment, then, Blord stood staring down into the hole. Until this instant, his nervous system had been geared to going down into the secret tunnel. Now, suddenly, he wasn't so sure. After all, his long run purpose was to establish a contact with the commander of the other ship.

Why not, then, let himself be caught?

With eyes narrowed, Blord shook his head. There was such a thing as the right moment. He had a very solid conviction that these pirates shot first, and asked no questions afterwards.

He lowered himself into the hole, and pulled the chair back into place with a hand lever. It locked into position with the faintest of clicks.

His spirits rose considerably. There was nothing wonderful or even original about the secret passageways. Their uniqueness was of a personal variety. Except for the far-off Earth firm that had built the machine, he was the only person who knew the passageways existed.

Blord hurried along the narrow corridor, and presently he came to a small room, compactly furnished. Compactly? At first sight it contained no furniture at all. But Blord bent, inserted his fingers into a depression—and a chair folded up from the floor. Another tug, and the wall yielded a sound amplifier with many tubes, and complete with earphones.

He plugged in the electric current from the big flywheel in the adjoining room, and put on the earphones. A moment later the noise of hammering grew loud in his ears, and he had his first important information.

The invaders were trying to gain entrance through air lock C-4. It shouldn't take long.

It took about five minutes for

the hammering to stop. Then there was a hiss, followed by the clack of metallic boots. A short pause, then, while the gangway that connected the two ships was made air-tight; and then:

"Funny," a voice said, "usually they rush out to meet us, like we were rescuers."

"I hope there's plenty of women aboard." The second voice was rougher, cruder, husky with abnormal expectation.

A third voice, r a u c o u s l y commanding, roared, "All right, you two, get that inner lock open."

"O. K., O. K." Impatiently from the first voice. "Keep your shirt on, Captain Grierson."

"I'll shirt you," said the commanding voice.

It was not a brilliant retort. But Blord had his picture of a rough and rowdy crew and rougher officers, without morals of any kind. His lips tightened with the instinctive anger of a sensitive man, at the thought that high-grade women must have fallen into the clutches of these creatures in the past.

"O. K., there she is, captain." Satirically. "You lead the way, huh!"

There was a bellow from Captain Grierson. "I'll give the orders around here. Renson and Messner, you guard the entrance. We don't want anyone sneaking onto our ship. Pete!"

"Yeah?" A different voice.

"Throw an energy capsule to the end of that corridor."

There was a hissing whine, then a moment's silence, which was broken by Grierson saying with satisfaction:

"That'll knock out anybody with plans for an ambush. All right now. I want the ship taken in five minutes. Kill all the males, bring the females to my cabin for division. Each group send a man back to me here to report. Get!"

There was the stamping of many feet.

It was a victory of sorts to follow the groups by means of the amplifiers, and listen to their curses.

"No women! *Nobody* at all!"

Their amazement, their evil humor, was faintly tinged with anxiety. Blord could imagine the queasy alarm that was twisting through each brain in turn, as the men realized the fact of an apparently unmanned ship.

Not that they had anything to worry about. This was one time when Artur Blord was caught.

A voice was saying, "Maybe it's an old vessel that we missed when we first started."

"Yeah, but where are the bodies? There's always been bodies before."

Blord pictured that, not for the first time. In the years that his various spaceships had swung past Lorelei, he had had occasional thoughts about ships caught long, long ago by the enormous dark star. Some of those ships must have plunged to their doom hundreds of years before, straight into the

sun. Others, approaching at a slant, would have been forced into orbits, and become tiny planets, tombs for the crews and passengers aboard.

There had never in the long history of the Ridge Stars been a survivor of a ship caught by Lorelei.

His thoughts were interrupted. Grierson had been advised. Grierson was furious.

"What! Nobody aboard. Nonsense. Did you find out whose ship it is?"

There was silence. Blord could only assume that the captain was being handed some documents. He smiled darkly. This was a moment he had been waiting for.

The silence grew long. It was clear that somebody was undergoing shock. At last:

"Blord, eh? The great Artur Blord." The loud voice broke into laughter. "So the big shot, who never loses, has been caught."

The laughter ended. He said something that Blord didn't catch, but there was no mistaking the response, a roar of protest from a score of men:

"What do you mean, take him alive?"

"We kill all these guys, don't we?"

"To hell with prisoners!"

A bellow from Grierson temporarily ended that vicious opposition:

"This is the guy that picked up Professor King. I've got to find out for the big bosses what Blord knows about our racket here. Now, get to work and strip his ship. *Get!*"

The men departed reluctantly. Blord heard one of them mutter something about no one would get past him alive. And another snarled that he'd plug him the second he showed his dirty face.

It was not encouraging. The violence of those threats held Blord in hiding during the hours that followed. He knew this type of crew. No captain would dare override their will on a vital issue. Worse still, they were too ignorant to be reasoned with.

Once again, more sharply this time, the realization came to Blord that this was it. He would give his arguments of course, and strive with all his desperate might. He would try to delay until they had practically finished salvage operations, and no hope would he neglect. But the fact remained that the *crew* of this salvage ship would deal him death.

He waited until the yacht was stripped bare, until discovery was a matter of minutes. And then he climbed out into cavernous emptiness to where Captain Grierson was directing the mobile machines that had torn a ship to pieces in ten hours.

The captain's cabin of the freighter was an untidy arrangement of chairs, desks and cabinets. There was an adjoining bedroom. the door of which was partly open. The instant he had stepped into the ship Blord had become aware of subtle noises. The sounds were

here, too, great engines whispering in their theoretically soundproofed tubes. The primitive noises they made were dimmed by an awful suppression, yet *there* and alive. In this part of space, that vague rustle was a reality as sweet as life. Atomic engines working in the dead zones of Lorelei the dark.

Blord sat down, and came straight to his point. His original purpose in coming to the destroyer star had been to get aboard the salvage ship on the scene, *this very ship,* and then use the great basic force of bribery and corruption to find out definitely whether or not Squire and Blakely were behind the piracy. He wanted the names of other salvage ships, who their captains were, names of saboteur mechanics, and, if possible, a clue to the secret of the Lorelei zone engine.

The actual engine, of course, would have been destroyed the moment the pirates realized they were going to be boarded. Not that that mattered now. The important thing was that money must still be his method. Money in such quantities that every man aboard would be dazzled out of his sense of danger.

Grierson was easy. Globules of sweat broke out on his heavy face after Blord offered him personally eleven million stellors.

"Man," he said huskily, "I'm game. I know that this Lorelei racket won't last another year. If you can think of something—but you know that kind of animal out there."

"First of all," said Blord, "get the ship out of the Lorelei zone."

That too was easy. And the problem of who would do the arguing with the crew was solved with equal simplicity. There was a man aboard who saw himself receiving eleven million stellors, a sum which Blord had figured on the average life expectancy on the basis of Grierson's income per year from the Lorelei piracy. To the men Grierson made Blord's offer of a hundred thousand stellors for each individual, the money to be paid in space under conditions that would insure safety to each side.

Blord stood in the doorway, and watched the scene fascinated. He had dealt with rough men in his time, but they had been engaged in honest work, and the roughness was merely a part of their characters. The ruling element here was fear, the atmosphere charged with latent violence.

No explanations seemed satisfactory. How would the money be paid over? From another ship. That meant the moment Blord was safe aboard that other machine, the ship would follow them, and call the space patrol.

The hulking commander was a determined salesman. Over and over, he described Blord's reputation for fairness. He shouted down interruptions with such ferocity that dozens of men were cowed for minutes at a time.

Twice, he threw chairs at men who catcalled. Four times the pandemonium was so great that no individual voice was audible. But when a measure of silence finally fell, there was the bulldog voice of the captain bellowing louder than the loudest of his crew.

None of the arguments availed. Their suspicion was too great. They refused to recognize clever solutions. The offer of money was meaningless to men who distrusted their own ability to judge whether or not an idea had loopholes in it. Death they could grasp. Dead men didn't sit in witness chairs, and identify pirates. The end of argument came when one of the men shouted:

"He's taking up with Blord. Let's kick him out into space, too."

The heckler had made one mistake. He was too near Grierson when he yelled. The big man leaped like a bear, and launched his fist. The man went down with a crash, and got a kick in the face that broke his skull. He groaned, and was dead. And then there was the voice of Grierson, enormous in the startled silence.

"All right, you moronic cretins, I'm through arguing. I had to tell you about the offer, didn't I? But never mind that now. I'm going to give you an hour to think it over. Whatever you decide at the end of that hour goes. And if anyone makes so much as one objection to that, I'll bash his face in personally. Now take this carrion out, and get!"

They filed almost meekly down the corridor. There was no question that Captain Grierson had a way with his crew. The big man sank wearily into a chair.

"Eleven million stellors," he groaned. "The lunkheads." He looked up. "You realize, of course, there's nothing more I can do."

"Oh, yes there is," said Blord. "And I'll guarantee you a million stellors for it, whether I live or die."

"He waited, tense, and saw a gleam come into the other's blue eyes. Grierson said, interested, "How would you work it?"

"Let me," Blord urged, "talk to Magrusson on the eldo. He doesn't know the fix I'm in. You can listen in and prove that from what he says. I'll tell him to pay it to you provided you give me what I want first."

There was silence. The commander scowled at the floor. Finally:

"How do you know I won't take it away from you the moment the call is over? And get the million anyway."

"Because," said Blord, "I'll pay you the other ten million if I come out of this mess alive."

Once more silence, then, "What do you want me to give you?"

Blord told him. It was half an hour later that he walked firmly to the air lock. The outer entrance was white with frost around the edges. The bitter cold chilled his thinly clad body. He watched anxiously as the lock opened.

There was a hiss as all the air rushed out.

Blord did not hesitate. He had no desire to be shot as had Professor King. Before the two men in the spacesuits could shove him, he took a running leap.

The empty blackness of space engulfed him like a sponge of pitch.

It was a normal morning for the vast city of Suderea, not too warm, not too cool. The buildings glowed in the sunlight. And Margaret Merrill, walking to work for the sixth day of her employment with Squire & Blakely, glanced into every shining miracle of science that was a shop window, and thrilled to the sense of excitement that fairly quavered in the air.

People hurried past her as if bent on some mission. That was the wonderful thing about the planets of the stars that formed the curious deformation in space known as the Ridge. They infected people with the germ of eagerness and expectancy. And then fulfilled the highest hopes.

It seemed that way to Margaret. "Here I am," she thought, "secretary to Artur Blord, and in a few months I've learned enough of his methods to solve a problem that he hasn't yet found a solution for."

She had phoned Magrusson the day before and discovered that Blord was still in space. It was that that had decided her. Today must be her last day with Squire & Blakely. This morning she would finish her work against them, and depart.

She would be back in the Blord Building before Artur returned.

She laughed happily, and knew she was wonderful, and deserved to be Blord's secretary for the rest of her life with all that went with it.

She spent the morning as she had planned. Several times she thought, "The trouble with Artur is that he didn't draw all the possible lessons from that crook, Corbett. He used him for a physical purpose, whereas he was far more valuable mentally."

She was almost ready to leave when the door opened, and Andrew Squire and Leslie Blakely came in. The junior partner smiled his mask of a smile.

"How are things?" he said.

There was something in their attitude that made her feel tense. She mustered a smile.

"A few more days," she said. "I've already made several improvements that reduce the time of saturation, but I want perfection."

"Let me see one of the gadgets," Blakely said.

She handed it over. He put it in his pocket and stood staring at her. A few feet away Squire took a blaster from his pocket. He looked at Blakely, as if waiting for orders. There was no question that he was the lackey and Blakely the master.

The big man seemed unarmed. He was smoking a cigar, half leaning against one of the metal benches. His sleepy eyes were

contented, looking at peace with the world.

Margaret faltered, "I don't think I understand." She was wondering if they had found out what she had done.

It was Blakely who spoke. "She doesn't understand, Mr. Squire," he said. He sounded sarcastic.

Mister Squire did not turn his head. His eyes were like gimlets, shifting rapidly over a small area, watching only her.

"It's comparatively s i m p l e," Blakely went on. "We are about to be arrested for—imagine—piracy. It will take a few years and a lot of money to fight the charge, and meanwhile we can't take any chances of a gold mine like the healthograph getting out of our control. In my opinion, once people can use the thing to check the state of their nutrition throughout the day, it should make a billion stellors."

The Co-ordination Department of the Artur Blord Holding Company, had estimated an even higher potential return.

Blakely was bracing himself, nervous suddenly. He had a private superstition that when a person had to be killed, there should be no delay. Without turning, he said:

"All right, Squire—*shoot!*"

Blord made one mistake. As he jumped, he used the edge of the lock for the final thrust. The cold of

the metal struck through his shoe, and seared the bottom of his foot. Even as he fumbled hurriedly in the belt under his shirt for an oxygen capsule, he felt the numbness of that brief contact with metal that had been long exposed to the absolute zero of space.

There was no other hardship, no pain, nothing but darkness and waiting. The oxygen capsule, supercompressed, opened up slowly. He breathed without effort, and each capsule lasted about twenty minutes.

The frozen sole of his shoe warmed gradually by induction, and there was no real cold after that. For space is not cold. Cold is contact. Cold is snow and ice and the air that touches you. These things can be cold, and can transfer cold to organic bodies.

But space *is* an absence of heat. In that perfect vacuum, a warm object gradually loses its innate heat by radiation. So slowly that, after three hours, Blord noticed only that he was not quite so warm as he had been. There was a faint suggestion of cold to come. And if he had remained where he was, eventually his body would have been reduced to freezing, then to zero Fahrenheit, then down and down to absolute zero, at which point, chemical, electronic and other changes would have modified the original structure radically.

At the end of three and a half hours, the energy detector capsule, for which he had given Grierson one million stellors, produced results. A half dozen ships flashed up, and he was taken aboard the flagship of Commander Jasper, safe.

It was nearly a month later that Magrusson hurried into Blord's penthouse office on Delfi II. He was pasty-faced and agitated.

"Artur," he said, "Hedgerow, of Companies Commissioner has just contacted me from Fasser IV. He wants to talk to you."

Blord's face must have remained impassive, for the general manager groaned:

"Don't you understand? This is the governmental authority who can impound all your property if Squire and Blakely can prove that it was you who ruined them."

All Blord said was, "Put him on."

It was a well-fed face that came onto the eldoplate, and the voice was smooth and baritone. After a minute, Blord said:

"This is a new one on me. I didn't even know firms could be ruined these days. I thought they were protected from every kind of pressure, and even from insanity. How was it done?"

"Like every other firm," said the commissioner, "Squire and Blakely have people who are empowered to buy equipment for them. There's a certain amount of graft always going on but—"

Blord interrupted to say that he understood that only too well. There had recently been a case of betrayal of trust in his own organization. A man named Corbett.

"Fortunately," he said with a suavity of his own, "these chaps always chisel on petty levels."

He saw that the commissioner was smiling grimly. Squire and Blakely, the man explained, had not been so lucky. One of their women buyers had suddenly ordered four hundred million stellors worth of equipment in their name, through the registered circuit, and then skipped off to parts unknown. The equipment was obsolete, without resale value. The firm was instantly bankrupt.

"If it was a woman," said Blord, "how do I fit in?"

It seemed that Artur Blord had recently been caught by Lorelei, had escaped by a miracle, and had afterwards captured the ship responsible, thus exposing an extraordinary criminal salvage enterprise. The captain of the salvage ship had disappeared as mysteriously as had Leah Carroll, the woman buyer, but a number of the crew had turned State's evidence, and accused Squire and Blakely. The two men being wealthy, the case might have been prolonged for years, and then suddenly they had no money. From their death cell, they had appealed to the Companies Commissioner.

The smile which twisted the commissioner's face as he gave the account faded. He said seriously:

"There's one thing I'd like to ask you, Mr. Blord. Squire and Blakely did some wild talking when they were in my office. Among other things, they said they had this girl covered with a gun, and yet suddenly they woke up, and realized they had been unconscious for eighteen hours. Subsequently they

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discovered that the healthograph, with which the girl fooled them, had previously been patented by a Blord subsidiary. But never mind that. What I want to know is how could they have been made unconcsious?"

"Now there," said Blord heartily, "I can help you out. I have many defenses against such unexpected threats. If I had been in this Leah Carroll's place, I would have used a gas that squirts out of a button when the arm is raised in a certain manner, as if to ward off a blow. The effect is instantaneous."

Hedgerow laughed with a genuine admiration. "Blord," he said, "I've heard of your exploits for years, but this is the first time I've had a chance to talk to you. And I decided not to miss the opportunity. Congratulations on one of the smoothest performances that I've ever seen. As you know, convicted criminals cannot use the prosecuting facilities of the government, so even if we had the evidence that an agent of yours was responsible, we couldn't go after you."

The civil service executive nodded half to himself, a respectful expression on his face. "I'm beginning to understand how you acquired your reputation. Good luck, Mr. Blord."

He was smiling as his image faded. It was a knowing, almost elfin smile, astonishing to see on such a respectable face.

Blord turned away from the eldo, and saw that Magrusson was wiping his face with a handkerchief. The general manager looked very red, as if he was on the verge of having a stroke.

"Our closest call," he mumbled. "Just suppose Squire and Blakely *hadn't* been under sentence of death?"

He shivered. "Artur," he groaned, "these secretaries are going to be the death of me yet. Every one of them sooner or later has gone off on a tangent like this. And the worst of it is, they're crazy about you, and are doing it, so they think, to be helpful."

Blord was silent. He should, he realized, have recognized the first symptoms. Looking back, it seemed to him there had been unmistakable pointers.

He said, "What kind of a place did you get Margaret?"

Magrusson shrugged. "The usual. A vast estate. Endless money. I know it amuses you to do things like that, and, of course, *their* psychology is obvious. Whether they know it or not, they really want to be operators on their own, in the Ridge Star sense. Once started, that process leads to the most monstrous egomania."

"Thanks," said Blord dryly.

Magrusson seemed not to hear. "Miss Merrill," he said, "created something of a record. She lasted exactly three months and eleven days."

He finished, "Accordingly, of all your legitimate secretaries, she had the shortest run."

THE END.

Child of the Gods

by
A. E.
van
VOGT

***In a** world of war, assassination, and violence there seemed no place for the psychopathically shy and timid Clane. He could never appear in public, or rule as was his right—it seemed.*

By the time the boy was four, the scientist Joquin realized that drastic action was necessary if his mind was to be saved. Somewhere between three and four, Clane had realized that he was different. Enormously, calamitously different. Between four and six, his sanity suffered collapse after collapse, each time to be slowly built back again by the aging scientist.

"It's the other children," Joquin, white with fury, told the Lord Leader one day. "They torment him. They're ashamed of him. They defeat everything I do."

The Linn of Linn gazed curiously at the temple man. "Well, so am I ashamed of him, ashamed of the very idea of having such a grandson." He added, "I'm afraid, Joquin, your experiment is going to be a failure."

It was Joquin, now, who stared curiously at the other. In the six years that followed the crisis of the temples of the atom gods, he had come to have a new and more favorable regard for the Lord Leader. During those years, for the first time, it had struck him that here was the greatest civil administrator since legendary times. Something, too, of the man's basic purpose—unification of the empire—had shown occasionally through

the bleak exterior with which he confronted the world.

Here was a man, moreover, who had become almost completely objective in his outlook on life. That was important right now. If Clane was to be saved, the cooperation of the ruler of Linn was essential. The Lord Leader must have realized that Joquin's visit had a specific objective. He smiled grimly.

"What do you want me to do? Send him to the country where he can be brought up in isolation by slaves."

"That," said Joquin, "would be fatal. Do not forget, normal slaves despise the mutations as much as do freedmen, knights and patrons." He finished, "The fight for his sanity must be made right here in the city."

The other looked impatient. "Well, take him away to the temples where you can work on him to your heart's content."

"The temples," said Joquin, "are full of rowdy initiates and juniors."

The Lord Leader glowered. He was being temporized with, which meant that Joquin's request was going to be a difficult one to grant. The whole affair was becoming highly distasteful. Six years before, a mutation had been born to the Lord Leader's daughter-in-law, the Lady Tania. The mutation resulted from carelessness in the handling of the radioactive god-metals in one of the temples. And, while similar mutations occurred from time to time, Clane was the first ever to appear in an important family. Or, at least, if a mutation had ever before been born to a nobleman's wife, there was no record of it.

At the time of the birth, the Lord Leader allowed himself to be persuaded to let the child live. Joquin, the persuader, desired then —and apparently still—to prove that mutations had basically normal minds, needing only normal handling to become mature beings.

That theory was yet to be proved.

"I'm afraid, old one," said the Lord Leader gravely, "you are not being very sensible about this matter. The boy is like a hothouse plant. You cannot raise the children of men that way. They must be able to withstand the rough and tumble of existence with their fellows even when they are young."

"And what," flashed Joquin, "are these palaces of yours but hothouses where all your youngsters grow up sheltered from the rough and tumble of life out there?"

The old scientist waved his hand towards the window that opened out overlooking the capitol city of the world. The Leader smiled his acceptance of the aptness of the comparison. But his next words were pointed.

"Tell me what you want. I'll tell you if it can be done."

Joquin did not hesitate. He had stated his objections, and, having eliminated the main alternatives, he recognized that it was time to

explain exactly what he wanted. He did so. Clane had to have a refuge on the palace grounds, a sanctuary where no other children could follow him under penalty of certain punishment.

"You are," said Joquin, "bringing up all your male grandchildren on your grounds here. In addition, several dozen other children—the sons of hostages, allied chiefs and patrons—are being raised here. Against that crowd of normal, brilliant boys, cruel and unfeeling as only boys can be, Clane is defenseless. Since they all sleep in the same dormitory, he has not even the refuge of a room of his own. Now, I am in favor of him continuing to eat and sleep with the others, but he must have some place where none can pursue him."

Joquin paused, breathless, for his voice was not what it had been. And, besides, he was aware of the tremendousness of the request. He was asking that restrictions be put upon the arrogant, proud little minds and bodies of the future great men of Linn—patrons, generals, chieftains, even Lord Leaders of twenty, thirty, forty years hence. Asking all that, and for what? So that a poor wretch of a mutation might have the chance to prove whether or not he had a brain.

He saw that the Lord Leader was scowling. His heart sank. But he was mistaken as to the cause of the expression. Actually, he could not have made his request at a better time. The day before, the Lord Leader, walking in the grounds, had found himself being followed by a disrespectful, snickering group of young boys. It was not the first time, and the memory brought the frown to his face. He looked up decisively. He said:

"Those young rascals need discipline. A little frustration will do them good. Build your refuge, Joquin. I'll back it up for a while."

The palace of the Leader was located on Capitoline Hill. The hill was skillfully landscaped. Its grounds were terraced and built up, be-gardened and be-shrubbed until the original hill was almost unrecognizable to old-timers like Joquin.

There was a towering rock on a natural peak at the west end of the grounds. To reach it one followed a narrow path up a steep slope, and then climbed the steps that had been cut into the solid rock to the top of the rock itself.

The rock was bare until Joquin took it over. Swiftly, under his direction, slaves carried up soil, and slave gardeners planted shrubs, grass and flowers, so that there might be protection from the hot sun, a comfortable green on which to stretch out and an environment that was beautiful and colorful. He built an iron fence to guard the approaches to the pathway, and at the gate stationed a freedman who was six feet six inches tall and broad in proportion. This man had a further very special qualification in that a child of the gods had also been born to his wife some

four years before. The big man was a genial, friendly individual, who prevented the more rowdy boys from following Clane by the simple act of wedging his great body into the narrow gate.

For weeks after the aerie was ready, and the restriction imposed, the other children railed and shrieked their frustration. They stood for hours around the gate tormenting the guard, and yelling threats up to the rock. It was the imperviousness of the always friendly guard that baffled them in the end. And at long last the shivering boy on the aerie had time to become calm, to lose that sense of imminent violence, and even to acquire the first feeling of security. From that time on, he was ignored. No one played with him, and, while their indifference had its own quality of cruelness, at least it was a negative and passive attitude. He could live his private life.

His mind, that wounded, frightened and delicate structure, came slowly out of the darkness into which it had fled. Joquin lured it forth with a thousand cunnings. He taught it to remember simple poetry. He told the boy stories of great deeds, great battles, and many of the fairy tales currently extant. He gave him at first carefully doctored but ever more accurate interpretations of the political atmosphere of the palace. And again and again, ever more positively, he insisted that being born a mutation was something different and special and important. Anybody could be born ordinary human, but few were chosen by the gods of the atoms.

There was danger, Joquin knew, in building up the ego of a Linn to feel superior even to the human members of his own family.

"But," as he explained one day to the Lord Leader, "he'll learn his limitations fast enough as he grows older. The important thing now is that his mind at the age of eight has become strong enough to withstand the most vulgar and sustained taunting from other boys. He still stammers and stutters like an idiot when he tries to talk back, and it's pitiful what happens to him when he is brought into contact with a new adult, but unless surprised, he has learned to control himself by remaining silent.

"I wish," Joquin finished, "that you would let him accustom himself to occasional visits from you."

It was an oft repeated request, always refused. The refusals worried Joquin, who was nearly eighty years old. He had many anxious moments as to what would happen to the boy after his own death. And in order to insure that the blow would not be disastrous, he set about enlisting the support of famous scholars, poets and historians. These he first partially persuaded by argument, then introduced one by one as paid tutors to the boy. He watched each man with an alertness that swiftly eliminated those who showed in any way that they did not appreciate the

importance of what was being attempted.

The boy's education turned out to be an expensive generosity, as neither the allowances of the Lord Leader, his grandfather, or of Lord Creg, his father, were sufficient to cover the fees of the many famous men Joquin employed. Indeed, when Joquin died, just before Clane's eleventh birthday, the liquid assets of the estate barely sufficed to pay the minor bequests after death taxes were deducted.

He left ten million sesterces to be divided among juniors, initiates and seniors of various temples. Five million sesterces he bequeathed to personal friends. Two million more went to certain historians and poets in order that they might complete books which they had begun, and finally there were five great grandnephews who each received a million sesterces.

That disposed almost entirely of the available cash. A bare five hundred thousand sesterces remained to keep the vast farms and buildings of the estate in operation until the next crop was harvested. Since these were left in their entirety, along with upward of a thousand slaves, to Clane, there was a short period when the new owner, all unknown to himself, was on the verge of bankruptcy.

The situation was reported to the Lord Leader, and he advanced a loan from his private purse to tide over the estate. He also took other steps. He learned that Joquin's slaves were disgruntled at the idea of belonging to a mutation. He sent spies among them to find out who were the ringleaders, and then hanged the four chief troublemakers as examples. It also came to his ears that Joquin's great grandnephews, who had expected the estate, were making dark threats about what they would do to the "usurper." The Lord Leader promptly confiscated their share of the inheritance, and sent all five of them to join Lord Creg's army which was on the point of launching a major invasion against Mars.

Having done so much, the old ruler proceeded to forget all about his grandson. And it was not until some two years later, when, seeing the boy one morning pass beneath the window of his study, he grew curious. That very afternoon he set out for the rock aerie to have a look at the strangest youth who had ever been born into the Linn family.

At this time, the Martian war was two years old, and it was already proving itself to be the most costly campaign ever launched. From the very beginning, when it was still in the planning stages, it had aroused men to bitter passions. To fight it or not to fight it—three years before that had been the question that split the inner government group into two violently opposing camps. Lord Creg Linn, father of Clane, son of the Lord Leader, and general in chief of the expedition, was from the first completely and without qualification opposed to the war.

He had arrived at the city from

Venus some three years before in his personal space yacht, and accompanied by most of his staff. He spent months, then, arguing with his family and with various powerful patrons.

"The time has come," he told his hearers, "for the empire to stand firm on all its frontiers. From a single city state we have grown until we now dominate all Earth with the exception of a few mountainous territories. Four of the eleven island continents of Venus are allied to us. And on the three habitable moons of Jupiter, our allies are the strong powers. The Martians of Mars, it is true, continue to rule that planet in their brutal fashion, but it would be wise to leave them alone. The tribes they have conquered are constantly rebelling against them, and will keep them busy for a measurable time. Accordingly, they are no danger to us, and that must be our sole consideration for all future wars."

If reports were true, many patrons and knights were convinced by this reasoning. But when they saw that the Lord Leader favored the war, they quickly changed their tune, at least publicly.

Lydia, the Lord Leader's wife, and Lord Tews—Lydia's son by a previous marriage—were particularly in favor of the invasion. Their argument, and it eventually became the Lord Leader's, was that the Martians had condemned themselves to war by their complete refusal to have commercial and other intercourse with the rest of the Solar System. Who knew what plans were being made, what armies were under secret training, or how many spaceships were abuilding on a planet that for more than a dozen years had admitted no visitors.

It was a telling argument. Lord Creg's dry suggestion that perhaps the method used by the empire to invade the Venusian island of Cimbri was responsible, did not confound the supporters of the war. The method had been simple and deadly. The Cimbri, a suspicious tribe, agreed finally to permit visitors. They were uneasy when over a period of several months some thirty thousand stalwart young male visitors arrived singly and in groups. Their uneasiness was justified. One night the visitors assembled in the three major Cimbrin cities, and attacked all centers of control. By morning a hundred thousand inhabitants had been slain, and the island was conquered.

The commanding general of that expedition was Lord Tews. At his mother's insistence, an ashamed patronate voted him a triumph.

It was natural that the Lydia-Tews group should regard Creg's remark as a product of envy. The suggestion was made that his words were unworthy of so illustrious a man. More slyly, it was pointed out that his own wars had been drawn out, and that this indicated a cautious nature. Some even went so far as to say that he did not trust the fighting abilities of Linnan armies, and they immediately added the comment that this was

a base reflection on the military, and that the only real conclusion to be drawn was that he was personally a coward.

To Lord Creg, doggedly holding to his opinions, the greatest shock came when he discovered that his own wife, Tania, supported the opposition. He was so angry that he promptly sent her a bill of divorcement. The Lady Tania, whose only purpose in supporting the war was that it would enhance her husband's career, and accordingly improve her position, promptly suffered a nervous breakdown.

A week later she was partially recovered, but her state of mind was clearly shown by the fact that she took a gig to her husband's headquarters in the camp outside the city. And, during the dinner hour, before hundreds of high officers, she crept to him on her hands and knees, and begged him to take her back. The astounded Creg led her quickly through a nearby door, and they were reconciled.

From this time dated the change in the Lady Tania. Her arrogance was gone. She withdrew to a considerable extent from social activities, and began to devote herself to her home. Her proud, almost dazzling beauty deteriorated to a stately good looks.

It was an anxious wife who kissed her husband good-by one early spring day, and watched his spear-nosed yacht streak off to join the vast fleet of spaceships mobilizing on the other side of Earth for the take-off to Mars.

Spaceships, like all the instruments, weapons and engines of transport and war known since legendary times, had their limitations. They were the fastest thing possessed by man, but just how fast no one had ever been able to decide. At the time of the invasion of Mars, the prevailing belief was that spaceships attained the tremendous speed of a thousand miles an hour in airless space. Since the voyage to Mars required from forty to a hundred days—depending upon the respective positions of the two planets—the distance of Mars at its nearest was estimated at the astounding total of one million miles.

It was felt by thousands of intelligent people that this figure must be wrong. Because, if it was correct, then some of the remoter stars would be hundreds of millions of miles away. This was so obviously ridiculous that it was frankly stated by many that the whole uncertainty reflected on the ability and learning of the temple scientists.

A spaceship one hundred and fifty feet long could carry two hundred men and no more on a trip to Mars lasting sixty days. It had room for many more, but the air supply created an insurmountable limitation. The air could be purified by certain chemicals for so long, then it gave out.

Two hundred men per ship—that was the number carried by each space transport of the first fleet to leave Earth. Altogether there were five hundred ships. Their destination was the great

desert known as Mare Cimmererium. A mile-wide canal cut through the edge of this desert, and for a hundred miles on either side of the canal the desert was forced back by a green vegetation that fed on the thousands of tiny tributary canals. Oslin, one of the five important cities of the Martians, was located in a great valley at a point where the canal curved like a winding river.

In a sense the canals were rivers. During spring, the water in them flowed steadily from north to south, gradually slowing until, by midsummer, there was no movement.

Oslin had a population, which was reported to be well over a million. Its capture would simultaneously constitute a devastating blow to the Martians and an unmatched prize for the conquerors.

The fleet reached Mars on schedule, all except one ship turning up at the rendezvous within the prescribed forty-eight hours. At midnight on the second day, the vessels proceeded ten abreast towards the canal and the city. A site some five miles from the city's outskirts had been selected, and, one after another, the lines of ships settled among the brush and on the open fields. They began immediately to discharge their cargoes —all the soldiers, most of the horses and enough equipment and food for a considerable period.

It was a dangerous six hours. Spaceships unloading were notoriously vulnerable to certain types of attack ships fitted with long metal rams, capable of piercing the thin metal plates of which the outer walls were constructed. For an attack ship to catch a transport in the air meant almost certain death for everyone aboard.

The attacker, approaching from the side, transfixed an upper plate, and forced the transport over on its back. Since there were no drive tubes on the topside to hold the ship in the air, it usually fell like a stone. Periodic attempts to install drive tubes in the top as well as the bottom caused radioactive burns to crews and passengers, and no amount of interposed lead seemed to stop the interflow between the tubes.

The six hours passed without an attack. About two hours after dawn, the army began to move along the canal towards the city. When they had marched about an hour, the advance guards topped a hill overlooking a great valley beyond which was glittering Oslin. They stopped, rearing their horses. Then they began to mill around.

Swiftly, a messenger raced back to Lord Creg, reporting an incredible fact. A Martian army was encamped in the valley, an army so vast that its tents and buildings merged into the haze of distance.

The general galloped forward to have a look. Those about him reported that he was never calmer as he gazed out over the valley. But his hopes for a quick, easy victory must have ended at that moment.

The army ahead was the main Martian force, comprising some six hundred thousand men. It was

under the personal command of King Winatgin, and present was the king's famous brother, Sashernay.

Lord Creg had already made up his mind to attack at once, when a small fleet of enemy attack ships whisked over the hill, and discharged a shower of arrows at the group on the hill, wounding nearly four dozen soldiers. The commander in chief was unhurt, but the escape was too narrow for comfort. Swiftly, he gave the necessary orders.

His purpose was simple. King Winatgin and his staff undoubtedly knew now that an attack was coming. But it was one thing for him to have the information, and quite another to transmit it to an encamped and spread-out army.

That was the only reason why the battle was ever in doubt. The attackers were outnumbered six to one. The defense was stolid and uncertain at first, then it grew heavy from sheer weight of numbers. It was later learned that a hundred thousand Martians were killed or wounded, but the small Linnan army lost thirty thousand men, killed, prisoner and missing. And when it had still made no headway by late afternoon Lord Creg ordered a fighting retreat.

His troubles were far from over. As his troops fell back alongside the greenish red waters of the canal, a force of five thousand cavalry, which had been out on distant maneuvers, fell upon their rear, cutting them off from their camp, and turning their retreat away from the canal, towards the desert.

The coming of darkness saved the army from complete destruction. They marched until after midnight, before finally sinking down in a fatigued sleep. There was no immediate rest for Lord Creg. He flashed fire messages to his ships waiting out in space. A hundred of them nosed cautiously down and discharged more equipment and rations. It was expected that attack ships would make sneak attacks on them, but nothing happened, and they effected a successful withdrawal before dawn.

All too swiftly, the protecting darkness yielded to bright daylight.

The new materiel saved them that day. The enemy pressed at them hour after hour, but it was clear to Lord Creg that King Winatgin was not using his forces to the best advantage. Their efforts were clumsy and heavy handed. They were easily outmaneuvered, and towards evening by leaving a cavalry screen to hold up the Martian army, he was able to break contact completely.

That night the Linnan army had a much needed rest, and Lord Creg's hopes came back. He realized that, if necessary, he could probably re-embark his forces and get off the planet without further losses. It was a tempting prospect. It fitted in with his private conviction that a war so ill begun had little chance of success.

But, reluctantly, he realized re-

turn to Linn was out of the question. The city would consider that he had disgraced himself as a general. After all, *he* had selected the point of attack, even though he had disapproved of the campaign as a whole.

And that was another thing. It might be assumed that he who had opposed the war, had deliberately lost the battle. No, definitely, he couldn't return to Linn. Besides, in any event he had to wait until the second fleet with another hundred thousand men aboard arrived about two weeks hence.

Two weeks? On the fourth day, the thin striplike ditches of canal water began to peter out. By evening the soldiers were fighting on sand that shifted under their feet. Ahead, as far as the eye could see was a uniformly flat red desert.

There was another canal out there somewhere about nineteen days march due east, but Lord Creg had no intention of taking his army on such a dangerous journey. Seventy thousand men would need a lot of water.

It was the first time in Creg's military career that he had ever been cut off from a water supply. The problem grew tremendous when eleven out of a dozen spaceships sent for water exploded as they approached the camp, and deluged the desert and the unlucky men immediately below with boiling water. One ship got through, but the water aboard was beginning to boil, and the ship was saved only when those aboard operated the air lock mechanism, letting the steaming water pour out onto the sand.

The almost cooked commander emerged shakily from the control room, and reported to Lord Creg.

"We did as you ordered, sir. Got rid of all our equipment, and dunked the entire ship in the canal, using it as a tanker. It began to get hot immediately."

He cursed. "It's those blasted water gods that these Martians worship. They must have done it."

"Nonsense!" said Lord Creg. And ordered the man escorted back to his ship by four high officers.

It was a futile precaution. Other soldiers had the same idea. The water and canal gods of the Martians had started the water boiling, and so the ships had exploded. Lord Creg in a rough and ready speech delivered to a number of legions pointed out that nothing happened to water brought in the ordinary water tanks of the ships.

A voice interrupted him, "Why don't you bring the water in them then?"

The men cheered the remark, and it was scarcely an acceptable explanation after that to answer that the main body of ships could not be risked in such an enterprise.

On the seventh day the army began to get thirsty. The realization came to Lord Creg that he could not afford to wait for the arrival of the second fleet. He accordingly decided on a plan, which had been in the back of his

mind when he originally selected Oslin as the city which his forces would attack.

That night he called down two hundred ships, and packed his army into them, nearly three hundred and fifty men to the ship. He assumed that Martian spies had donned the uniforms of dead Linnans, and were circulating around his camp. And so he did not inform his staff of the destination until an hour before the ships were due.

His plan was based on an observation he had made when, as a young man, he had visited Mars. During the course of a journey down the Oslin Canal, he noticed a town named Magga. This town set among the roughest and craggiest hills on Mars, was approachable by land through only four passes, all easily defendable.

It had had a garrison twenty years before. But Lord Creg assumed rightly that, unless it had been reinforced since then, his men could swamp it. There was another factor in his favor, though he did not know it at the time of his decision. King Winatgin, in spite of certain private information, could scarcely believe that the main Linnan invasion was already defeated. Hourly expecting vast forces to land, he kept his forces close to Oslin.

Magga was taken shortly after midnight. By morning the troops were ready for siege with a plenitude of canal water on one flank. When the second fleet arrived a week later, they too settled in Magga, and the expedition was saved.

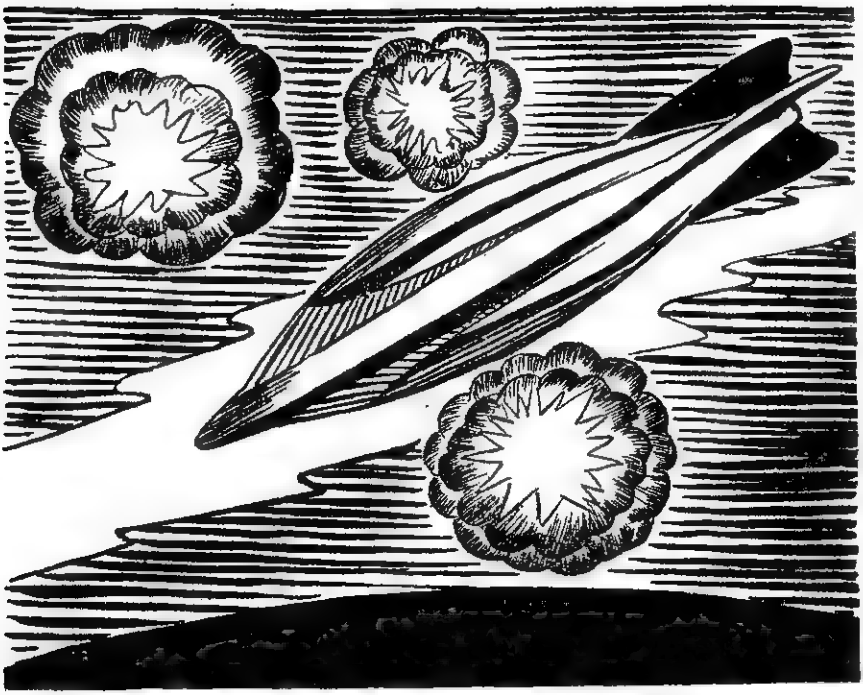
The extent of this defensive victory was never fully appreciated in Linn, not even by Lord Creg's followers and apologists. All that the people could see was that the army was jammed into a small canal town, and seemed doomed, surrounded as it was by a force which outnumbered it more than six to one. Even the Lord Leader, who had taken many a seemingly impregnable position in his military days, secretly questioned his son's statement that they were safe.

Except for forays, the army remained all that summer and the following winter in Magga. It was besieged the whole of the next year, while Lord Creg doggedly demanded another two hundred thousand men from a patronate, which was reluctant to send more men into what they considered certain destruction. Finally, however, the Lord Leader realized that Creg was holding his own, and personally demanded the reinforcements.

Four new legions were on their way on the day that the Lord Leader started up the pathway that led to the aerie-sanctuary of his mutation grandson.

He was puffing by the time he reached the foot of the rock. That startled him. "By the four atom gods," he thought, "I'm getting old." He was sixty-three, within two months of sixty-four.

The shock grew. *Sixty-four.*



He looked down at his long body. An old man's legs, he thought, not so old as some men of sixty-four, but there was no question any more that he was past his prime.

"Creg was right," he thought, aghast. "The time has come for me at least to retrench. No more wars after Mars except defensive ones. And I must name an heir, and make him co-Leader."

It was too big a subject for the moment. The thought, heir, reminded him where he was. One of his gradsons was up there with a tutor. He could hear the murmuring baritone of the man, the occasional remark of the boy. It sounded very human and normal.

The Lord Leader frowned, thinking of the vastness of the world and the smallness of the Linn family. Standing there, he realized why he was come to this spot. Everyone of them would be needed to hold the government together. Even the lamebrains, even the mutations must be given duties consonant with their abilities.

It was a sad and terrible thing to realize that he was approaching the ever more lonely peak of his life, able to trust only those of his own blood. And even they clung together only because of the restless tide of ambition that surged on every side.

The old man smiled, a mixture of wry, grim smile. Something of

the steely quality of him showed in the natural shape his jaws and chin assumed. It was the look of the man who had won the bloody battle of Attium that made Linn his, the smile of the man who had watched his soldiers hack Raheinl to pieces with battle-axes.

"There was a man," he thought, still amazed after nearly thirty years that the leader of the opposing group should have been so perverse. "What made him refuse all my offers? It was the first time in the history of civil war that such an attempt at conciliation was made. I was the compromiser. He wanted the world, and I who did not want it, at least not in that way, had to take it perforce to save my own life. Why must men have all or nothing?"

Surely, Raheinl, cold and calm, waiting for the first ax to strike, must have realized the vanity of his purposes. Must have known, too, that nothing could save him, that soldiers who had fought and bled and feared for their lives would stand for no mercy to be shown their main enemy.

In spite of the impossibility, Raheinl had received a measure of mercy. The Leader recalled with crystallike clarity his selection of the executioners. He had ordered that the very first blow be fatal. The crowd wanted a torture, a spectacle. They *seemed* to get it, but actually it was a dead man who was hacked to bits before their eyes.

Watching the great Raheinl being destroyed chilled forever the soul of the Lord Leader. He had never felt himself a participant of the murder. The crowd was the killer, the crowd and its mindless emotions, its strength of numbers that no man could ignore without the deadliest danger to himself and his family. The crowd and its simple bloodthirstiness frightened him even while he despised it, and influenced him even while he skillfully used it for his own ends. It was rather dreadful to think that not once in his entire life had he made a move that was not motivated by some consideration of the crowd.

He had been born into a world already devastated by two powerful opposing groups. Nor was it a question of which group one joined. When the opposition was in power they tried to kill, disgrace or exile all the members of every family of the other party. During such periods, the children of many noble families were dragged through the streets on the end of hooks and tossed into the river.

Later, if you were among those who survived, it was a question of striving to attain power and some control of your own group. For that, too, could not be left to chance and sympathy. There were groups within groups, assassinations to eliminate dangerous contenders for leadership, an enormous capacity on everybody's part for murder and treachery.

The survivors of that intricate battle of survival were—*tough.*

Tough survivor the Lord Leader

Linn pulled his mind slowly out of its depth of memory, and began to climb the steps cut into the towering rock itself.

The top of the rock had a length of twenty feet, and it was almost as wide. Joquin's slaves had deposited piles of fertile soil upon it, and from this soil flowering shrubs reared up gracefully, two of them to a height of nearly fifteen feet.

The mutation and the tutor sat in lawn chairs in the shade of the tallest shrub, and they were so seated that they were not immediately aware of the Lord Leader's presence.

"Very well, then," the scholar, Nellian, was saying, "we have agreed that the weakness of Mars is its water system. The various canals, which bring water down from the north pole, are the sole sources of water supply. It is no wonder that the Martians have set up temples in which they worship water as reverently as we worship the gods of the atoms.

"It is, of course, another matter," Nellian went on, "to know what use can be made of this weakness of Mars. The canals are so wide and so deep that they cannot, for instance, be poisoned even temporarily."

"Macrocosmically speaking," said the boy, "that is true. The molecular world offers few possibilities except the forces which man's own body can bring to bear."

The Lord Leader blinked. Had he heard correctly? Had he heard a boy of thirteen talk like *that?*

He had been about to step forward and reveal himself. Now, he waited, startled and interested. Clane went on:

"The trouble with my father is that he is too trusting. Why he should assume that it is bad luck which is frustrating his war, I don't know. If I were he I would examine the possibilities of treachery a little more carefully, and I'd look very close indeed at my inner circle of advisers."

Nellian smiled. "You speak with the positivity of youth. If you ever get onto a battlefield you will realize that no mental preconception can match the reality. Vague theories have a habit of collapsing in the face of showers of arrows and spears, and infighting with swords and axes."

The boy was imperturbable. "They failed to draw the proper conclusions from the way the spaceships carrying the water exploded. Joquin would have known what to think about that."

The talk, while still on a high grammatical level, was, it seemed to the Lord Leader, becoming a little childish. He stepped forward and cleared his throat.

At the sound, the scholar turned serenely, and then, as he saw who it was, he stood up with dignity. The mutation's reaction was actually faster, though there was not so much movement in it. At the first sound, he turned his head.

And that was all. For a long moment, he sat frozen in that position. At first his expression remained unchanged from the quiet

calm that had been on it. The Lord Leader had time for a close look at a grandson whom he had not seen so near since the day Clane was born.

The boy's head was completely human. It had the distinctive and finely shaped Linn nose and the Linn blue eyes. But it had something more, too. His mother's delicate beauty was somehow interwoven into the face. Her mouth was there, her ears and her chin. The face and head were beautifully human, almost angelic in their structure.

It was not the only human part of him. But most of the rest was at very least subtly unhuman. The general shape was very, very manlike. The body, the torso, the legs and arms—they were all there, but wrong in an odd fashion.

The thought came to the Lord Leader that if the boy would wear a scholar's or scientist's gown, and keep his arms withdrawn into the folds—his hands were normal—no one would ever more than guess the truth. There was not even any reason why that face should not be put on one of the larger silver or gold coins, and circulated among certain remote and highly moral tribes. The angel qualities of Clane's face might very well warm many a barbarian heart.

"Thank the gods," thought the Lord Leader, not for the first time, "that he hasn't got four arms and four legs."

His mind reached that thought just as the paralysis left the boy. (It was only then that the Lord Leader realized that Clane had almost literally been frozen where he was.) Now, the transformation was an amazing spectacle. The perfect face began to change, to twist. The eyes grew fixed and staring, the mouth twitched and lost its shape. The whole countenance collapsed into a kind of idiocy that was terrible to see. Slowly, though it didn't take too long, the boy's body swung out of his chair, and he stood half crouching, facing his grandfather.

He began to whimper, then to gibber. Beside him, Nellian said sharply:

"Clane, control yourself."

The words were like a cue. With a low cry, the boy darted forward, and ducked past the Lord Leader. As he came to the steep, stone stairway, he flung himself down it at a reckless speed, almost sliding down to the ground more than twenty feet below. Then he was gone down the pathway.

Silence settled.

Nellian said finally, quietly, "May I speak?"

The Lord Leader noted that the other did not address him by his titles, and a fleeting smile touched his lips. An anti-Imperialist. After a moment, he felt annoyed —these upright republicans—but he merely nodded an affirmative to the verbal request. Nellian went on:

"He was like that with me too, when Joquin first brought me up to be his tutor. It is a reversion to an emotional condition which he

experienced as a very young child."

The Lord Leader said nothing. He was gazing out over the city. It was a misty day, and his left eye no longer had normal vision, so the haze of distance and the blur in one of his vision centers hid the farther suburbs. From this height, they seemed to melt into the haze—houses, buildings, land grown insubstantial. And yet, beyond, vaguely beyond, he could see the winding river, and the countryside partially hidden by the veils of mist. In the near distance were the circus pits, empty now that a great war was taxing the human resources of an earth which had attained the colossal population of sixty million inhabitants. In his own lifetime, the number of people had nearly doubled.

It was all rather tremendous and wonderful, as if the race was straining at some invisible leash, with its collective eyes on a dazzlingly bright future, the realities of which were still hidden beyond remote horizons.

The Lord Leader drew his mind and his eyes back to the rock. He did not look directly at Nellian. He said:

"What did he mean when he said that my son, Lord Creg, should watch out for treachery close to him?"

Nellian shrugged. "So you heard that? I need hardly tell you that he would be in grave danger if certain ears heard that he had made such remarks. Frankly, I don't know where he obtains all his information. I do know that he seems to have a very thorough grasp of palace intrigue and politics. He's very secretive."

The Lord Leader frowned. He could understand the secretiveness. People who found out too much about other people's plans had a habit of turning up dead. If the mutation really knew that treachery had dogged the Martian war, even the hint of such knowledge would mean his assassination. The Leader hesitated. Then:

"What did he mean about the spaceships with water blowing up just before they landed? What does he know about things like that?"

It was the other's turn to hesitate. Finally, slowly:

"He's mentioned that several times. In spite of his caution, the boy is so eager for companionship, and so anxious to impress, that he keeps letting out his thoughts to people like myself whom he trusts."

The scholar looked steadily at the Lord Leader.

"Naturally, I keep all such information to myself. I belong to no side politically."

The great man bowed ever so slightly. "I am grateful," he said with a sigh.

Nellian said after an interval, "He has referred a number of times to the Raheinl temple incident which occurred at the time of his birth, when four temples exploded. I have gathered that Jo-

quin told him something about that, and also that Joquin left secret papers at his estate, to which the boy has had access. You may recall that he has visited the main estate three times since Joquin's death."

The Lord Leader recalled vaguely that his permission had been asked by Nellian on several occasions. The man went on:

"I hope it is unnecessary for me to say that the boy's mentality, as distinct from his emotional nature, is very mature, at least that of an eighteen- or nineteen-year-old."

"Hm-m-m," said the Lord Leader. His manner grew decisive. "We must cure him of his weakness," he said. "There are several methods." He smiled reminiscently. "In war, when we want to end a man's fear, we subject him to repeated dangers in actual combat. He might be killed, of course, but if he survives he gradually acquires confidence and courage. Similarly, an orator must first be trained in voice control, then he must speak again and again to acquire poise and an easy address."

The Leader's lips tightened thoughtfully. "We can hardly initiate him into war. The soldiers unfortunately regard mutations as ill omens. Public speaking—that can best be done by putting him into a temple in one of the remoter temples. From the security of a scientist's robes, he can deliver the daily incantations, first to the atom gods in private, then in the presence of scientists, initiates and juniors, and finally before the public. I will make arrangements for that experience to begin tomorrow. He does not need to live at the temple.

"Finally, sometime next year, we will assign him a separate residence, and have a couple of attractive slave girls from his estate brought up. I want small, mild, meek girls, who will not try to boss him. I'll select them myself, and give them a good talking to."

He added matter-of-factly: "They can be sold later in remote regions, or put to death, depending on how discreet they are. After all, we can't have talkative fools giving detailed accounts of the physical defects of members of my family."

The Lord Leader paused, and looked keenly at Nellian. "What do you think of that as a beginning?"

The scholar nodded judicially. "Excellent, excellent. I am glad to see you taking a personal interest in the boy."

The Lord Leader was pleased. "Keep me in touch about"—he frowned—"once every three months."

He was turning away when his gaze lighted on something half hidden in the brush at one edge of the rock.

"What's that?" he asked.

Nellian looked embarrassed "Why," he said, "why, uh, that's, uh, a device Joquin rigged up."

The scholar's self-consciousness amazed the Leader. He walked over and looked at the thing. It

was a metal pipe that disappeared down the side of the rock. It was almost completely hidden by creeping vines, but little glints of it were visible here and there both against the rock and against the cliff farther down.

He drew back, and he was examining the open end of the pipe again, when it spoke huskily, a woman's voice:

"Kiss me, kiss me again."

The Lord Leader placed a tuft of grass over the pipe end, and climbed to his feet amused. "Well, I'll be a—" he said. "A listening device, straight down into one of the rendezvous of the palace grounds."

Nellian said, "There's another one on the other side."

The Lord Leader was about to turn away again, when he noticed the notebook beside the tube. He picked it up, and rippled through it. All the pages were blank, and that was puzzling until he saw the bottle of ink and the pen half hidden in the grass where the book had been.

He was genuinely interested now. He picked up the bottle, and pulled out the cork. First, he looked hard at the ink, then he smelled it. Finally, with a smile, he reinserted the cork, and replaced the bottle in the grass.

As he descended the pathway, he was thinking, "Joquin was right. These mutations can be normal, even supernormal."

He was not greatly surprised two weeks later when Nellian handed him a message from Clane.

The letter read:

To my grandfather,
Most Honorable Lord Leader:

I regret exceedingly that my emotions were so uncontrollable when you came to see me. Please let me say that I am proud of the honor you have done me, and that your visit has changed my mind about many things. Before you came to the aerie, I was not prepared to think of myself as having any obligations to the Linn family. Now, I have decided to live up to the name, which you have made illustrious. I salute you, honorable grandfather, the greatest man who ever lived.

Your admiring and humble grandson,
Clane

It was, in its way, a melodramatic note, and the Lord Leader quite seriously disagreed with the reference to himself as the greatest man of all time. He was not even second, though perhaps third.

"My boy," he thought, "you have forgotten *my* uncle, the general of generals, and his opponent the dazzlingly wonderful personality, who was given a triumph before he was twenty, and officially when he was still a young man voted the right to use the word "great" after his name. I knew them both, and I *know* where I stand."

Nevertheless, in spite of its wordy praise, the letter pleased the Lord Leader. But it puzzled him, too. There were overtones in it, as if a concrete decision had been made by somebody who had the power to do things.

He put the letters among his files of family correspondence, starting a new case labeled "CLANE." Then he forgot about it. It was recalled to his mind a week later

when his wife showed him two missives, one a note addressed to herself, the second an unsealed letter to Lord Creg on Mars. Both the note and the letter were from Clane. The stately Lydia was amused.

"Here's something that will interest you," she said.

The Lord Leader read first the note addressed to her. It was quite a humble affair.

To my most gracious grandmother,
Honorable lady:

Rather than burden your husband, my grandfather, with my request, I ask you most sincerely to have the inclosed letter sent by the regular dispatch pouch to my father, Lord Creg. As you will see it is a prayer which I shall make at the temple next week for his victory over the Martians this summer. A metal capsule, touched by the god metals, Radium, Uranium, Plutonium and Ecks, will be dedicated at this ceremony, and sent to my father on the next mail transport.

Most respectfully yours,
Clane.

"You know," said Lydia, "for a moment when I received that, I didn't even know who Clane was. I had some vague idea that he was dead. Instead he seems to be growing up."

"Yes," said the Lord Leader absently, "yes, he's growing."

He was examining the "prayer" which Clane had addressed to Lord Creg. He had an odd feeling that there was something here which he was not quite grasping. Why had this been sent through Lydia? Why not direct to himself?

"It's obvious," said Lady Linn, "that since there is to be a temple dedication, the letter must be sent."

That was exactly it, the Lord Leader realized. There was nothing here that was being left to chance. They *had* to send the letter. They *had* to send the metal dedicated to the gods.

But why was the information being conveyed through Lydia?

He reread the prayer, fascinated this time by its ordinariness. It was so trite, so unimportant, the kind of prayer that made old soldiers wonder what they were fighting for—morons? The lines were widely spaced, to an exaggerated extent, and it was that that suddenly made the Leader's eyes narrow ever so slightly.

"Well," he laughed, "I'll take this, and have it placed in the dispatch pouch."

As soon as he reached his apartment, he lit a candle, and held the letter over the flame. In two minutes, the invisible ink was beginning to show in the blank space between the lines, six lines of closely written words between each line of the prayer.

The Lord Leader read the long, precise instructions and explanations, his lips tight. It was a plan of attack for the armies on Mars, not so much military as magical. There were several oblique references to the blowing up of the temples many years before, and a very tremendous implication that something entirely different could be counted on from the gods.

At the end of the letter was a space for *him* to sign.

He did not sign immediately, but in the end he slashed his signature on to the sheet, put it into the envelope and affixed his great seal of state. Then he sat back, and once more the thought came:

But why Lydia?

Actually, it didn't take long to figure out the extent of the treachery that had baffled Lord Creg's sorely pressed legions for three years.

As close as that, the Lord Leader thought grayly. As close in the family as that.

Some of the plotting must have been done in one or other of the rendezvous some sixty feet below the rock aerie where a child of the gods lay with his ear pressed to a metal tube listening to conspiratorial words, and noting them down in invisible ink on the pages of an apparently blank notebook.

The Lord Leader was not unaware that his wife intrigued endlessly behind his back. He had married her, so that the opposition would have a skillful spokesman in the government. She was the daughter of one of the noblest families in Linn, all the adult males of which had died fighting for Raheinl. Two of them were actually captured and executed.

At nineteen, when she was already married and with child—later born Lord Tews—the Lord Leader arranged with her husband for what was easily the most scandalous divorce and remarriage in the history of Linn.

The Lord Leader was unconcerned. He had already usurped the name of the city and empire Linn for his family. The next step was to make a move to heal what everybody said was the unhealable wound left by the civil war. Marriage to Lydia was that move, and a wondrously wise one it had been.

She was the safety valve for all the pent-up explosive forces of the opposition. Through her maneuvers, he learned what they were after. And gave as much as would satisfy. By seeming to follow her advice, he brought hundreds of able administrators, soldiers and patrons from the other side into the government service to manage the unwieldy populations of Earth, and rule solar colonies.

In the previous ten years, more and more opposition patrons had supported his laws in the patronate w i t h o u t qualification. They laughed a little at the fact that he still read all his main speeches. They ridiculed his stock phrases: "Quicker than you can cook asparagus." "Words fail me, gentlemen." "Let us be satisfied with the cat we have." And others.

But again and again during the past decade, all party lines dissolved in the interests of the empire. And, when his agents reported conspiracies in the making, further investigation revealed that no powerful men or families were involved.

Not once had he blamed Lydia for the various things she had done.

She could no more help being of the opposition than he, years before, had been able to prevent himself from being drawn, first as a youth, then as a man, into the vortex of the political ambitions of his own group. She would have been assassinated if it had ever seemed to the more hotheaded of the opposition that she was "betraying" them by being too neutral.

No, he didn't blame her for past actions. But this was different. Vast armies had been decimated by treachery, so that Lord Creg's qualities as a leader would show up poorly in comparison to Lord Tews'.

This was personal, and the Lord Leader recognized it immediately as a major crisis.

The important thing, he reasoned, was to save Creg, who was about to launch his campaign. But meanwhile great care must be taken not to alarm Lydia and the others. Undoubtedly, they must have some method of intercepting his private mail pouch to Creg.

Dared he stop that? It wouldn't be wise to do so. Everything must appear normal and ordinary, or their fright might cause some foolhardy individual to attempt an impromptu assassination of the Lord Leader.

As it was, so long as Lord Creg's armies were virtually intact, the group would make no radical moves.

The pouch, with Clane's letter in it, would have to be allowed to fall into their hands, as other pouches must have done. If the letter was opened, an attempt would probably be made to murder Clane. Therefore—what?

The Lord Leader placed guards in every rendezvous of the palace grounds, including two each in the two areas at the foot of the aerie. His posted reason for setting the guards was on all the bulletin boards:

I am tired of running into couples engaged in licentious kissing. This is not only in bad taste, but it has become such a common practice as to require drastic action. The guards will be removed in a week or so. I am counting on the good sense of everyone, particularly of the women, to see to it that in future these spectacles are voluntarily restricted.

A week or so to protect Clane until the dedication at the temple. It would be interesting to see just what the boy did do with the dedicated metal, but, of course, his own presence was impossible. It was the day after the dedication that the Lord Leader spoke to Nellian, casually:

"I think he should make a tour of Earth. Haphazard, without any particular route. And incognito. And start soon. Tomorrow."

So much for Clane. More personal, he made a friendly visit to the guards' camp outside the city. For the soldiers, it turned out to be an unexpectedly exciting day. He gave away a million sesterces in small but lavish amounts. Horse races, foot races and contests of every kind were conducted, with prizes for the winners, and even

losers who had tried nobly were amazed and delighted to receive money awards.

All in all, it was a satisfactory day. When he left, he heard cheers until he reached the Martian gate. It would take several weeks at least, if not months, to cause disaffection among those troops.

The various precautions taken, the Lord Leader dispatched the mail pouch, and awaited events.

The group had to work fast. A knight emptied the mail pouch. A knight and a patron scrutinized each letter, and separated them into two piles. One of these piles, the largest one by far, was returned to the pouch at once. The other pile was examined by Lord Tews, who extracted from it some score of letters, which he handed to his mother.

Lydia looked at them one by one, and handed those she wanted opened to one or the other of two slaves, who were skilled in the use of chemical. It was these slaves who actually removed the seals.

The seventh letter she picked up was the one from Clane. Lydia looked at the handwriting on the envelope, and at the name of the sender on one side, and there was a faint smile on her lips.

"Tell me," she said, "am I wrong, or does the army regard dwarfs, mutations and other human freaks as bad omens?"

"Very much so," said one of the knights. "To see one on the morning of battle spells disaster. To have any contact with one means a great setback."

The Lady Leader smiled. "My honorable husband is almost recalcitrantly uninterested in such psychological phenomena. We must accordingly see to it that Lord Creg's army is apprized that he has received a message from his mutation son."

She tossed the letter towards the pouch. "Put this in. I have already seen the contents."

Hardly more than three quarters of an hour later, the dispatch carrier was again on his way to the ship.

"Nothing important," Lydia said to her son. "Your stepfather seems to be primarily concerned these days with preserving the moral stature of the palace grounds."

Lord Tews said, "I'd like to know why he felt it necessary to bribe the guards' legion the other day."

Lord Creg read the letter from Clane with an amazed frown. He recognized that the boy's prayer had been used to convey a more important message, and the fact that such a ruse had been necessary startled him. It gave a weight to the document, which he would not ordinarily have attached to so wild a plan.

The important thing about it was that it required only slight changes in the disposition of his troops. His intention was to attack. It *assumed* that he would attack, and added a rather unbelievable psychological factor. Nevertheless, in its favor was the solid truth that eleven spaceships filled with water had

exploded, a still unexplained phenomenon after two years.

Creg sat for a long time pondering the statement in the letter that the presence of King Winatgin's army at Oslin had not been accidental, but had been due to treachery hitherto unknown in Linn.

"I've been cooped up here for two years," he thought bitterly, "forced to fight a defensive war because my stepmother and her plumpish son craved unlimited power."

He pictured himself dead, and Tews succeeding to the Lord Leadership. After a moment, that seemed appalling. Abruptly, decisively, he called on a temple scientist attached to the army, a man noted for his knowledge of Mars.

"How fast do the Oslin canal waters move at this time of the year?"

"About five miles an hour," was the reply.

Creg considered that. One hundred and twenty miles a day. A third of that should be sufficient, or even less. If the dedicated metal were dropped about twenty miles north of the city, the effect should be just about perfect.

The second battle of Oslin that was fought ten days later was never in doubt. On the morning of the battle, the inhabitants of the city awoke to find the mile wide canal and all its tributary waters a seething mass of boiling, steaming water. The steam poured over the city in dense clouds. It hid the spaceships that plunged down into the streets. It hid the soldiers who debouched from the ships.

LUCKY—
IN DEATH

Her name was Lucky Jones. She was blonde, beautiful, and she always won at everything, but she didn't have much luck when a murder was committed near her . . .

A strange team named Petey and Sam Clark take Doc Savage on a strange errand, fraught with danger, suspense and terror.

Don't miss THREE TIMES A CORPSE in the August issue of

DOC SAVAGE
AT ALL NEWSSTANDS

By mid-morning King Winatgin's army was surrendering in such numbers that the royal family was unable to effect an escape. The monarch, sobbing in his dismay, flung himself at Creg's feet, and then, given mercy, but chained, stood on a hill beside his captor, and watched the collapse of the Martian military might.

In a week, all except one remote mountain stronghold had surrendered, and Mars was conquered. At the height of the triumph, about dusk one day, a poisoned arrow snapped out of the shadows of an Oslin building and pierced Lord Creg's throat.

He died an hour later in great pain, his murderer still unfound.

When the news of his death reached Linn three months later, both sides worked swiftly. Lydia had executed the two slave chemists and the dispatch carrier a few hours after she heard of Creg's victory. Now, she sent assassins to murder the two knights and the patron who had assisted in the opening of the mail. And, simultaneously, she ordered Tews to leave the city for one of his estates.

By the time the Lord Leader's guards arrived to arrest him, the alarmed young man was off in his private spaceship. It was that escape that took the first edge off the ruler's anger. He decided to postpone his visit to Lydia. Slowly, as that first day dragged by, a bleak admiration for his wife built up inside him, and the realization came that he could not afford to jeopardize his relations with her, not now when the great Creg was dead.

He decided that she had not actually ordered the assassination of Creg. Some frightened henchman on the scene, fearing for his own safety, had taken his own action; and Lydia, with a masterly understanding of the situation, had merely covered up for them all.

It might be fatal to the empire if he broke with her now. By the time she came with her retinue to offer him official condolences, his mind was made up. He took her hand in his with tears in his eyes.

"Lydia," he said, "this is a terrible moment for me. What do you suggest?"

She suggested a combination State funeral and triumph. She said, "Unfortunately, Tews is ill, and will not be able to attend. It looks like one of those illnesses that may keep him away for a long time."

The Lord Leader recognized that it was a surrender of her ambition for Tews, at least for the time being. It was in reality a tremendous offer, a concession not absolutely necessary in view of his own determination to keep the whole affair private.

He bent and kissed her hand. At the funeral, they marched together behind the coffin. And in all the great throng of mourners surely the least noticed was a boy wearing the robes of a scientist in the company of a scholar. It was even said afterwards that Clane Linn was not present.

But I was there.

THE END.

Brass Tacks

"Who Goes There?" was by Don A. Stuart, and appeared in August, 1938. As to dour prophecy; it sometimes pays to make a warning sign read "Drive Slow—You May Meet A Fool Any Minute."

Dear Sir:

Today, I purchased a copy of "The Best of Science Fiction," edited by Groff Conklin and a really splendid book and read within your equally splendid and well-written preface. When I had finished, I found myself forming an impression that put me in much the same frame of mind as your anonymous friend who for some, according to you, strange reason could not abide science fiction. The reason for my own dislike, while almost the same as that of your friend, went a little further, I believe, into the underlying fundamental psychology involved.

The cause of your friend's, and correspondingly my own dislike for science fiction, lies not so much in its real "possibility"; in that it could happen, but rather that what is discussed or described as happening has such frightful implications. Ninety-eight percent of your writers, I have discovered, are veritable prophets of doom! They forecast in one form or another, either the utter destruction, or the transformation through radical and unpleasant changes, of the whole of mankind. Rarely, if ever, do your authors hold out glowing and shining pictures of the future of mankind. Believe me, if one were to contemplate seriously the rough treatment in general that the combined talents of your contributors have managed to conjecture through the pages of your magazine, then it would be simply logical to gravely consider the sensibility of blowing out one's brains in

order to prevent your own as well as that of untold generation's suffering the tortures of such tragic prognostications.

Oh, the stories occasionally end happily enough in a strained sort of way with the hero or heroine as the case may be, emerging unscathed and triumphant from the trials of unbelievable holocausts, catastrophes and cosmic debacles. But what of the rest of us? Small comfort indeed for the average man that is just dumb enough to be one of the common herd, that some super hero in the not too distant future may have to take on the load of humanity in general because the rest of us have succumbed to the onslaught of a hard and cruel fate.

Yes, what of the little man who is part of the teeming millions who must go on in their little ruts, trusting to the powers that be for his ultimate salvation; is there naught for him but obliteration in the titanic interplay of colossal forces that your writers carefully and cleverly predict as threatening the security of man? Has he no hope for happiness other than a dim and not often articulate belief in the existence of a God whose promise of everlasting peace in the hereafter is a feeble palliative in a world of discomfort, misery and pain?

You state that the primary motivating forces in the march of scientific progress are the unsatisfied wants of man. Too true, but does this not hold the same for man's unsatisfied spiritual wants? Whatever man wants badly enough, he ultimately gets. What more prime need does man have today than a freedom from fear? Yet he is such an animal that there will ever arise challenges to that freedom. Challenges that lie not alone in the tremendous forces hidden in the nature of this or other worlds; not in the unknown inventions, elements, or universes to be discovered and conquered; but in man himself.

Man's struggle against his own soul lies at the bottom of his fears for the future. His ability to recognize this and guide his own destiny accordingly is the key to all prophecies concerning this and future civilizations.

Your writers, therefore, display sometimes an alarming lack of faith in the belief of man in himself; a gross underestimation of his basic worth. There is a tremendous worth and dignity in being a human, not only because humans are the highest form of life on this planet, not only because of the intelligence endowed to humans that has manifested itself in an unequalled adaptability to environment, but in the recognition of man of the evil inherent in himself and his efforts to escape or suppress it.

Therefore it would be hard to accept the picture of man degenerating into either a race of senile toothless polyphemic-encephalics concerned only with the mental gymnastics involved in concocting pure abstract thought, or of cavemen whose descent into brute savagery has been caused by endlessly recurring wars. No, man has shown himself worthy of something better than any such catastrophe, through an unconquer-

able faith, born two millenniums ago, that he was not created to perish from this earth. This faith that has emerged victorious from original persecution and tyranny, to triumph under the crushing impact of world conflict after world conflict, and the insidious attack of the recent Nazi philosophies and ideologies to guide the destiny of man through century after century, millennium after millennium in the overall pattern of its founder.

You may then wonder why I bought "The Best in Science Fiction" if I am so dead set against the materialistic philosophies behind the stories which have been largely gleaned from Astounding Science Ficton. To tell the truth, I do like well-written stories involving the fantastic, the unusual and the unknown. Mr. Conklin has deftly chosen the cream of the crop, done the weeding out that has always balked me. I have read Astounding from time to time but have been inevitably scared off by the sure doom predicted therein. The well-chosen compilation of Mr. Conklin is a luxurious easy-to-read book that promises many a pleasurable evening of leisured reading.

You can be rightly proud of your magazine since it contains among its contributors all the leading lights of the field of science fiction. Such names as: Murray Leinster, Robert Heinlein, A. E. Van Vogt, Ross Rocklynne, et cetera constitute the super galaxy of a heaven filled with lesser constellations.

I had not meant originally to write such a long and rambling letter, realizing that as editors go, you are probably up to your neck in work. I had for a purpose mainly to ask for a point of information. Some time ago, back around 1938 I believe, you printed a stoyr by A. E. Van Vogt entitled "Who Goes There?" I wonder if it would be possible to tell me in which issue of Astounding it appeared? This I imagine must constitute a weak sort of anticlimax after all the banging away I've been doing at science fiction. Perhaps my attitude and reasoning can best be explained by confessing that I am an addict of fantasy; the aphelion of science fiction. In spite of your disgust, I would appreciate whatever aid you can find the time to give in finding the van Vogt story.

By way of ending, believe me, things aren't going to work out as badly as they seem!—John A. Savage, 584 West 152nd Street. New York 3, N. Y.

Human nature can be changed, but I sometimes fear it takes atomic power—explosively applied—to overcome the inertia!

Phoenix, Arizona.

Dear Mr. Campbell:

Your April editorial revives the old "who will watch the watchmen?" question in another form. Obviously when it becomes possible for any garret genius or basement gadgeteer to play mad scientist and liquidate or volatize a large city, some means of spotting and eliminating the more violent and dangerous

mental quirks will be indispensable. And, of course, there *will* have to be elaborate safeguards to keep the technique from being used to enforce total universal conformity with any particular philosophy or set of prejudices.

It's very much a planetary rather than an intra-national problem. The citizens of the world must be protected against the messianic complexes of any minority *or majority*. (Cf. de Camp's "The Contraband Cow.") Think of the possibilities for trouble if the psychological technology of, say "Brave New World," or even of some Heinlein yarns, should be developed before World Government or reasonable facsimile materializes, and used to solidly indoctrinate a sizable area of the globe to a religious faith in a new National Socialism, State Capitalism, or other New Order. It is to shudder. They very nearly have it now. The "constant drip of water" principle is pretty effective, and it's being used more or less in every country in the world. Yes, "psychology must advance faster than nuclear physics," but the psychology is potentially the more dangerous.

Even if the keenest psychological tools be kept purely for the treatment of dangerous screwballs by properly trained and supervised technicians, it is almost certain that advertising and publicity in general will be put on a more scientific and effective basis. It may prove possible to restrain the molders of opinion in some degree—remember how Heinlein's news interpreters were restricted to words of a not-too-high emotional index?—but the safest bet is to develop the principles of critical judgment in the individual.

Granting—as you and A. A. Smith agreed in Brass Tacks—that emotion has a necessary and legitimate function, I think it can be better channeled and directed than it is at present. The members of the human race can't all be transformed into strictly logical, reasoning beings overnight, but surely they can be taught to recognize and mistrust violent appeals to their emotions.

I think education throughout the world must take a new tack, with a shift in emphasis from memorizing and indoctrination to the development of tolerant and reasonable but skeptical attitudes. There are elaborate programs for teaching people what to believe, but they learn how to think only by accident if at all. At a stage in human progress when the only certainty is that we know very little about anything, isn't there something slightly fantastic about a system that concentrates on cramming heads with endless reams of data but has no provision for teaching the principles and practice of logical thinking, that in fact strongly discourages any manifestations of independent thought? Shouldn't there be some instruction in recognizing and distinguishing between logic and sophistry? And why not a course in the mechanics of prejudice in which everyone would be encouraged to dig out, analyze, and compensate his own irrational prejudices and phobias?

Understand I'm not talking about

just remodeling the colleges and universities. It needs to start down at the elementary level, even to a limited extent at pre-school age in the very process of learning the language.

Everyone must be thoroughly persuaded of the validity of a few axiomatic principles of civilized living: the basic necessity of social co-operation; the fundamental right of every citizen to believe in and preach and practice any way of life, however cockeyed, that does not actively menace the welfare of his fellows; the fact that there are two or more sides to any question and that no one is qualified to judge it until he has considered all the possibilities. But aside from this, each person from a very early age should be encouraged to form his own opinions on a sound basis of reasoning about everything he has any occasion to have opinions about, and to hold all such opinions subject to revision in the light of new evidence or arguments. The only way to learn to think is by practice.

It may even prove, as psychology advances, that the allegedly "nonverbal" one-third of the populace whom the educators want to yank out of the standard curriculum and put to work on "vocational" training are not so dumb after all. I'm privately inclined to suspect that the difference between this group and the ones who can freely soak up book-larnin' is not in the colloidal structure of their brains but in the way they have learned to use them.

I have no detailed opinions on the form this education of the future should take. The apostles of Korzybski-Whitehead General Semantics seem to think they have something, and for all I know they may be right. "World of Ā" did nothing to improve my opinion of General Semantics, but that may have been the fault of A. E. van Vogt rather than of General Semantics.

How about an objective, nonpartisan article on the present state of development of and claims for and against General Semantics and such correlated subjects as calculus of statement? Append a thorough bibliography, of course. After all this crops up pretty frequently in serious modern science-fiction, and I doubt that most of your readers know much more about it than I do, which is practically nothing. With Atomic theory and technique a restricted subject as at present, I know of no subject of more general interest and importance.

The greatest difficulty will not be in laying out an improved scheme of education but in getting it accepted. Most parents don't want their children to learn to think for themselves, because the kids are pretty certain to note some terrific mistakes in the way their elders have been running the world. The kids are bound to start asking embarrassing questions and laughing at the old man's pet theories and torpedoing his favorite prejudices and generally failing to show the proper reverence of youth for age, to an even greater extent than they do under present circumstances. The old folks will accordingly howl to all the powers that be about any in-

fringement of their youngster's inalienable right to grow up as dumb and unreasonable and generally unenlightened and uncivilized as *they* did.

Of course it would be for the general good if the adults could be given the benefits of improved methods and theories as they develop, so that they might not only apply them personally but also assist in their children's training. But people stubbornly cherish outmoded mental habits, and such a scheme wouldn't take well with most of those who have had time to get sot in their ways. The only alternative would seem to be a gradual program of modernization over the course of generations.

This general program that I have sketched appears to me to be the only sound long-range hope for peace, prosperity, social justice, stability with progress, and all the rest of the things that science-fictionists and other forward-looking citizens regard as urgently necessary and desirable. We cannot achieve civilization by force or legal fiat, but only by gradually actually civilizing the race.

You may be right in saying that there will always be that problem of everyone wanting to save the world in the way that *he* knows is best; I doubt that it would be desirable to eliminate that particular urge. But I see no reason why it should remain a menace to the body politic. I think it can be harnessed and put to use to promote the general welfare.

And don't bring up that old adage that you can't change human nature. Human nature is at least nine-tenths myth. I'm not trying to stir up a heredity-environment argument, but there is no getting around the fact that human "nature" takes its color from the cultural matrix. There are a few innate urges and drives, that's all, and most of them are capable of being diverted and distorted and sublimated to an extent that they can take strange and unrecognizable forms of expression.

Since it has never been possible for any human being to grow up under a really favorable environment, no one knows what the human animal might be like in such case. Only a few halting steps above the brute level have been taken, and the possibilities of the human personality as a social unit and the human brain as a thinking machine have hardly begun to be explored.

All this, not to mention the possibility of better utilizing the subconscious, developing "intuition" and the like to full potentiality.

By the way, I agree with the Brass Tacker who opposed returning to large size. At least I'm agin the typing-size pages; the "standard" size has its points. Adding pocket-size pages enough to restore wordage to 100,000 while retaining the present proportion of ads and pictures would result in monstrously thick magazines, unless the thinner, crisper pages of one or two copies I've run across are used exclusively.

And *when* are you going to resurrect *Unknown Worlds?*—C. Burton Stevenson, Phoenix, Arizona.

Looking for an argument—!

Dear John:

My (t)rusty Underwood is herewith unsheathed with the avowed intent of shedding a few fragments of sweetness and light, and perchance a gem or two of wisdom among the brassier of the tacks reproduced in the April issue.

First for the Profound Philosophy boys, Joe Gibson and R. R. Anger, who held forth anent the need for world organization, control of atomic energy, and more eggs in the beer. Amen, amen, we need world organization, but we need some other things, too, and quick. We need to sharply lessen the really extreme inequalities between populations, we need a very considerable increase in the general world educational level, and most of all we need some measure of real world understanding, not just a few mouthfuls of platitudes between diplomats and public figures, but some honest to atom, hello-Joe-whatta-ya-know understanding between peoples.

Wars aren't started by atoms, and all the bombs in the world will never hurt a flea *until some human agency sets them off*. The real problem lies in the "science" of human motivation and conduct, rather than the nuclear lab, and the sooner we all latch on to the fact that this means all of us rather than three guys named Harry, Joe and Clement, the better chance.

However, gloomy as is the outlook for an early world order, on whatever footing we base our speculation, we need not become pessimists. Humanity does learn by experience, and it doesn't always have to be our own, either. Very few people swallow liquids from little bottles labeled "POISON," even though they have not themselves previously enjoyed the exquisite agony of arsenical death, and the number of persons diving from the Empire State building as a summer pastime is almost unbelievably small, although surely only a few people have hurt themselves falling much further than from a tall bar stool. Fact is, plenty of people like to get high, but not in a physical sense, if you follow me.

Granted that humans can learn from another's experience, or by witnessing a demonstration of something without themselves experiencing it, we have one of the most powerful tools for preventing war. Mass education by means of the motion picture, radio, good writing—enter here, science-fictioneers—and eye-witness accounts, of the overwhelming effects and unstoppable power of atomic explosives and radioactive poisons, and world opinion can call a halt to the ambitions of the few who want war. Let's run off a few tests of bombs, *big* ones, and let as much of the world's population get an eyeful and earful of the results as we can reach. By pressure, diplomatic and otherwise, we can make sure of reaching a fairly large section of the planet's people who are significant in the problem, that is, those who can have some influence on their country's official acts. The rest don't matter for this purpose. (And the moralists who wish to slug it out with me can

line up at the right, but tell 'em to come loaded.)

This type of "education" is guaranteed to make it a lot harder for even the power-hungry lads to get enough popular support to start another fracas. Of course other things have got to go along with this, such as really large scale exchange of students and tourists on a "swap even" basis, and a free press that is really free to observe and print whatever is going on in the world. The chief obstacle to this sort of program is Russia, and the chief reason for the Russian obstinacy is a not unfounded mistrust of the attitudes and motives of England and the United States, based on political events in the short life of that country which have been conveniently forgotten in Washington and London.

To sum up, we can have a world order without an atomic war, but it is going to take some tough-minded facing of facts, and even tough-minded hard work and self-sacrifice by a lot of people. There ain't no easy way.

And a quick bouquet to John Buddhue of Pasadena for his figures and deductions on the contrail of V2. It seems probable that diversion of the exhaust or slipstream gases by extreme deflections of the guiding fins may account for most of the observed kinks in the trail, although probably a more exhaustive analysis would be needed to establish this point definitely.

Oh yes, the matter of the "emotionless" superbeings. Lots of fun in a story, only it can't exist. Sad as it may seem to knock such an amusing fantasy in the head, it's gotta be done. The psychological definition of emotion is for practical purposes, motive. Since intelligent organisms act only on motive, we may safely assume that even the most super of superbeings will still have emotion, for without in there can be no activity, and hence no superbeing. To save the time and stamps of those who will insist that an organism can act without emotion, I suggest they consult the chapter on emotion in any recognized text on psychology. For volition to exhibit itself, there must be motive, and that motive is an emotion of some sort, be it never so faint.

On the other hand, the superbeing, whatever it be from bug to brontosaurus, will have to learn to *control* its emotions, perhaps to repress their outward expression, as most humans do even now, for uncontrolled emotion and unconsidered response to an immediate stimulus may in many cases be a strong factor for nonsurvival. A. A. Smith's letter pointed this out very adequately. This again, however, does not mean that the superbeing need or will be a deadpan, or the cold-blooded fish so many writers persist in writing as the "scientist" in the piece. Learning to control his punches and deliver them at the right time and spot did not make Joe Louis any less effective as a fighter. In fact, there is a persistent rumor among his opponents that it may have increased his effectiveness.

And while I'm at it, here's for an-

other persistent fallacy which insists on rearing its illogical head. Humanity does *not* automatically fear and hate the superior individual, merely because of his superiority. We fear and hate only those things which we suspect may do us injury, or lessen our chances to achieve the goals toward which we strive. In fact, the main tendency of humans seems to be to cleave to the superior beings, making them leaders, rewarding them with hero worship, and resting on their shoulders the greatest burdens in furthering human progress. On the other hand, we *do* fear those persons whom we suspect of having motives inimical to our own ambitions, and we fear them in direct proportion to their capacity for doing us injury, which increases with their ability. Thus, there is no reason we need hate "baldies" unless we suspect them of wishing to do us injury, and quite a bit of reason for suspecting a great many average citizens would welcome a baldy or two in the neighborhood after the newness wore off. By golly, it would certainly put a lot of politicians out of work if a few baldies of integrity and intellectual ability—which surely is *not* a necessary concomitant of telepathic ability — were elected to public office.

One more fallacy-execution on the mind readers, and I shuffle off to the feathers. Reading the other guy's plans and intent doesn't necessarily make you able to whip him, be it with knives, rifles, or rotten eggs. I know the other guy's intent when he starts that right coming my way. The mind may know in advance, but the flesh still may not be competent to block the oncoming knuckles, knife, or lead slug. In chess, it might work.

And that chap who wants to record television signals. Ouch! How about sync pulses? How about the enormous range of frequencies far above what can come through a loudspeaker? How about—but never mind that. What's the matter with the way television is already recorded, the photographic film? But here, I'm over my quota of fallacy slaughter, and still haven't put the boom on Keith Buchanan, of Amsterdam, Ohio. For Keith's appreciation of my pal Sturgeon's fine little squib in Brass Tacks, much thanks, but for his rather cavalier treatment of the

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bow as a hunting weapon, a resounding phooey. In the first place, the technology needed for bow and arrow manufacture, is far and away more simple and within the reach of the dazed citizen after the atom war, who undoubtedly would find a nomadic existence almost a necessity until crops could be gotten going again. In the second place, the reason bow and arrow hunters are not too successful nowadays can be laid at the door of the rifle hunters. What game there is left is hunted so assiduously by hordes of riflemen—in most states—that stalking is an even more demanding art than formerly. The game is thinner, shyer, and less well distributed than formerly. Consequently the "sport" of hunting has become more and more a matter of squads of "sportsmen" blasting away at three hundred yards with high-powered repeating rifles.

Let man learn again the arts of stalking and woodcraft, and the bow and arrow will easily keep meat in the pot, even before the natural increase and freedom from rifle slaughter allowed deer and other game to return to their natural condition. And on every other ground, portability, procurability of materials, replaceability, lack of game-frightening odor, noise, and rate of shooting — *not* firing — the bow is out in front. And before the muzzle loaders blow their percussion caps, let it be added that the writer is an ex-gunhound himself.

Aweel, it's enough for one charge. Let those who would make controversy fling themselves at their quills, or chisels and stone tablets. Surely there's a good argument here somewhere!—L. Jerome Stanton.

Anyway, one thing we can say about that square velocity: it ain't hep!

Dear John:

I feel I must rush to the aid of Einstein after George O. Smith's attack in the April issue. Come, George, get that tongue out of the cheek—don't you realize that some lemurian or Fortean might take your arguments seriously and use it for "evidence," thus accomplishing irreparable harm? No one said—or at least no one *should* have said—that you could not square a velocity. The point is that when you square a velocity you do not get a velocity, but a square velocity, which is as different as a square inch is from an inch. And if you use light-seconds per second as the unit of velocity in the Einstein equation $E = mc^2$ you indeed get but one unit of energy from one gram of mass. But what a unit! Not an erg, but what we might call a superg, some 9×10^{20} times larger.

For the benefit of any who tried to do arithmetic on Haldane's new universe, here are two errors I noticed in "Plan for a Universe," one yours and one my own:

Page 124, col. 1, line 9:

$\frac{r}{t} \lambda\nu \frac{1}{t} c$ should read $\frac{r}{t} = \lambda\nu = c$

Page 130, col. 1, line 4: *galactic radius* should read *universe radius.* —R. D. Swisher.

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